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A Continuation of the Osteographia Elephantina : Or, a Description of the Bones of an Elephant, which died near Dundee, April the 27th, 1706. By Mr. Patrick Blair.

Being come to the Internal Parts of the Head, we shall proceed *Inner Parts of the Head.* as in Treatises of *Osteology*, by taking Notice of its Structure, of the two Tables, *Diploe*, Figure and Extent of the inner Table, *Fosse*, Eminences and *Foramina* ; of all which in their order. As there is no Animal in proportion that is endued with a greater quantity of Brains than Man, so there is none that seems to have less than the *Elephant*. In the one, 'twas so order'd by the Wise Governor of all Things, that they might be sufficient for the Generation of so many Spirits, as are requisite for the Performance of the Rational and Animal Functions ; and in the other, had the quantity of Brains been greater, the *Principia Nervorum* had been more divided ; so that instead of being requisite, they had been vastly inconvenient, because the Nerves could not so well receive the Spirits dispers'd in a greater Mass, as now, when contracted within lesser bounds : And such a contrivance as this being requisite, the interposing of such a vast distance betwixt the two Tables of the Scull, as we shall come to give an Account of, is a stupendious Piece of Mechanism.

As we before observed, in the bottom of the Hole for the Root *Tab. 3. Fig. 1.* of the Trunk there are several *Lamina* (*b. b.*) to be seen. These *Lamina*, taking their Origin from hence, run backward in a Parallel, and sometimes oblique Line, to the second Table of the Scull, or that part of it which invests the Brain : And these *Lamina* being either horizontally, perpendicularly, or obliquely plac'd, meet with and intersect each other, forming intermediate *Cells of the Head.* Cavities or *Cellules* (*c. c.*) of different Magnitudes, Positions and *Fig. 4.* Figures, according to the Intergerine Walls or Sides, whereof they are compos'd : So that although Dr. *Moulin*, and after him *Tentzelius*, seem to assert, that they were for the most part triangular, yet I have observ'd them quadrangular, pentagonal, hexagonal, and rectangular, and even sometimes irregular. These Cells run, as I said, from the outer Table, or External Parts of the Scull (*a. a.*) to the inner Table or Seat of the Brain (*b. b.*) and communicate with one another by pretty large Holes, either toward

toward the inner or outer Table, and sometimes two meeting together in the middle frame a third. In a word, as there is no certain Rule observ'd in their Figure, so neither is there any in their Communication. The distance they fill up between the two Tables before is 11 Inches, at the Sides 8 Inches, toward the back-part but 3 Inches, and at the Hole for the Spinal Marrow (o.) both Tables meet together; for the Brain is plac'd in the lower and back-part of the Scull (Fig. 5.) All these *Cellules* were empty, and only obduc'd with a thin Membrane. And here I cannot but take Notice of what Dr. *Moulins* observes, namely, that there are several Blood Vessels pleasantly disseminated throughout the Surface of these *Cellules* with different Divariations; and *Tentzelius* says, he observ'd several Lineaments of Vessels after the same manner. This was not to be observ'd in ours at all, nor so much as the *Vestigium* of a Vessel to be seen; the reason whereof, I suppose to be this: When the one was burnt in *Ireland*, and the other over-whelm'd with Earth in *Germany*, both suffering violent Deaths, could not but have vast Strugglings and Wrestlings, such as Dr. *Moulins* says his had, and such as *Tentzelius* supposes that in *Germany* to have had also. By these violent Motions, the Blood could not but be propell'd with a vast force from the greater Trunks to the smaller Capillaries, where it distended the Vessels, and rendred them so perceptible to the view after the Death of the Animal; whereas this we treat of, having labour'd of a languishing Distemper for sometime, as appears by the *Polypus's* found in the Heart and other Vessels, the Blood could not but be very languid, and scarce convey itself to these Capillaries; So that the Sides of the Vessels being collaps'd, they were rendred imperceptible: But that which is more remarkable is, that not so much as any of the *Sulci*, which these Vessels might have made in the *Lamina*, do at all appear; and yet the *Sulci* were still very evident in the Bones found in *Germany*, with the Blood Vessels containing the dry Blood strictly glued to them, and chang'd into a yellowish Colour, and that perhaps after thousands of Years, as the same Author observes. Indeed upon viewing more narrowly the *Cellules*, I find all of their *Lamina* endued with small Holes of an indefinite Number, and irregularly plac'd, through which these Vessels seem to have pass'd from one *Cellule* to another: So that tho' not so observable, yet no doubt they have been dispers'd through them in this as well as in other *Elephants*.

We come next to enquire what may be the Use of the *Cellules*. Use of the
Cellules.
 There have been several Opinions advanc'd about them; as 1st. That since the *Elephant* has been observ'd to suck up a great deal of Water by the *Proboscis*, that the Water perhaps is received into these *Cellules*, because of the Communication they seem to have with the *Proboscis*, and that thereby they cool their Brain in hot Countries, where they abound. 2. That since the *Elephant* has a very acute Sensation of Smelling, they think the *Nervus Olfactorius* is dispers'd (after it has pass'd the *Os Ethmoides*) throughout the fine Membranes that obduce the *Lamina*, which describe these *Cellules*. 3. That these *Cellules* being interpos'd betwixt the two Tables of the Scull, they only serve to keep the Head from being too weighty. As to the first; admit the Water could be receiv'd into these *Cellules*, which from their Position at the Root of the Trunk, 'tis plain they cannot, there being no muscular Substance to expel these Waters, we cannot suppose this is their Use. As to the second; the *Nervus Olfactorius*, after it has pass'd the *Ethmoides*, does not at all communicate with these *Lamina*, but penetrates the *Os Vomeris*, whence the cartilaginous *Septum* of the *Proboscis* arises: So that these *Cellules* can be no ways assisting for that end, the Sensation of Smelling being chiefly perform'd in the *Proboscis*, and not by the Fibres of the *Nervus Olfactorius* dispers'd in these *Lamina*, which are quite otherwise dispos'd here, than in Men, Dogs, &c. whose *Lamina Spongiosa* are situated in the Root of the Nose; so that the Air must touch them before it reach the *Os Cribrosum*; whereas here the *Lamina* are so situated, that the Air touches the *Nervus Olfactorius* as soon as it can touch them. The third is to me more probable, and Dr. *Moulin* is of the same Thought, and that upon several Accounts; such as the Consideration of the small extent of the Seat of the Brain, to which had the rest of the Head been correspondent, it would have had no proportion to the Body; nor could the Muscles, fit for moving the Head, have sufficient space for their Insertion, nor the *Proboscis* for its Origin; so that there was a Necessity for interposing some distance betwixt the inner and outer Table of the Scull. Now this distance must be fill'd up with some intermediate Substance, and had that either been carnosous or osseous, whether spongyous or solid, or (as some think the *Sinus Frontales*, *Maxillares* & *Basilares* in human Sculls are) Mucous; should either of these have occupy'd such vast bounds, the Head would have been rendered too

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weighty.

weighty. Therefore it is wisely order'd by Providence, that there shall be only thin *Lamina* of Bones, so dispers'd, that the outer Table of the Scull may be more strengthened for supporting the Weight of the Muscle of the Head, Lower Jaw, and *Proboscis* adhering thereto, that it may have a Communication with the inner Table, and that the space betwixt these *Lamina* may be empty; lest by any intermediate-Substance, the Head had been too heavy, as is said, and the inner Table so burthen'd as to press too much upon the Brain, which might have disturbed the *Aconomia Animalis*. Analogous to this Structure we find in Oxen, which have the same *Cellules* betwixt the two Tables of their Scull, especially toward the Horns, whose Flints, as they are call'd with us, or the boney Substance, whereby that part of the Horn, which is toward the Head, is fill'd, is likewise cellulous, lest by their Weight, together with that of the Horns, they should prove uneasy to the Head: But lest by reason of these Vacuities, which are all plac'd in the upper and fore-part of the Head of the *Elephant*, (for the Brain and *Elevatores Capitis* are sufficient to depress its back-parts) it should be rendred so light, that it could not be equally pois'd or kept steady, the Teeth, both in the Upper and Lower Jaw, are rendred thus weighty to counterballance it.

Inner Surface of the Scull.

Tab. 3. Fig. 14.

We come next to consider the inner Surface of the Scull, where the Brain is lodg'd: 'tis in Figure like an Human one, but more Spherical, being from the Right to the Left 10 Inches, from before to behind 9 Inches, and from above to below at the *anterior Fossa* 7 Inches, betwixt the middle 5 Inches, and at the *posterior*, or Seat of the *Cerebellum*, 4 $\frac{1}{2}$ Inches. It has 4 *Fossæ*, and 5 Eminences. The *anterior Fossa* (*b. b.*) is circumscrib'd by the fore-part of the inner Table of the Scull before, and by the two *anterior* Eminences (*c. c.*) behind. Here the Brain sends forth its greatest Production; for at the hind part this *anterior Fossa* is depress'd streight down near 2 Inches, where the *Os Ethmoides* begins, which is of a singular Figure and Structure; for from the fore-part of the Seat of the Brain in the middle, there is here, as in most Sculls, an Eminence which runs obliquely downward, till it begins to form the *Crista Galli* (*d.*) so call'd in Human Subjects. This *Crista Galli* divides the *Os Ethmoides* into its right and left Part; 'tis pretty thick and broad at the Base, whence it arises from each side, till it begins to form a *Crena*, which is perforated by 3 Pair of Holes; and then there arises

a small *Spina* in the middle (*d.*) at the fore Extremity whereof, it being further extended than the *Ethmoides*, there is another Hole. From this *Crista Galli* run on each side several prominent convex Lines, some obliquely forward, others obliquely backward, others transversely; each of which is branch'd out twice or thrice toward the Circumference, which 'twas impossible to express very lively in so small a Figure. These Lines have some few Perforations running from their highest part, but most of them are betwixt their Interstices, where they are pleasantly dispers'd after some kind of order, which also we could not express in the Figure. The *Os Ethmoides* is not unlike a *Os Ethmoides*-Heart, as they usually represent it, being narrower at the hind part, where the *anterior Fossa* runs streight down from the fore-part of the *Sella Turcica* (*n.*) and broader at the fore-part of the Bone, which runs obliquely upward from it; 'tis from before to behind $3\frac{1}{2}$ Inches, and from the right to the left 4 Inches: Its Circumference is not altogether circular. The Speciality of this Structure gives ground to enquire into its Reason, and the acute Sensation of Smelling, wherewith, according to all Authors, this Animal is endued. In most of other Animals, neither is this *anterior* Production of the Brain so great, the Perforations of the *Os Cribrosum* so many, nor its extent so large: But in Animals of an acute Smelling, besides the Perforations of the *Os Cribrosum*, there are several spongy *Lamina* which arise from its lower part; each whereof are endued with Tunicles, wherein are variously dispers'd several Branches of the *Nervus Olfactorius*; and these *Lamina* are set very near to one another, as it were the Teeth in a Comb, or the *Lamella* in the lower Part of some Mushrooms. Both the Contrivance of the *Lamina* and their thick disposal, are very useful for Sensation; for whereas, had this *Nervus Olfactorius* been still in one Trunk, the Volatile Saline Particles, would have only acted upon such Filaments as compose the Surface; whereas the Nerve being variously dispers'd into divers Branches, and these Branches differently dispos'd into several Surfaces, 'tis capable to receive Impression from as many Saline Particles, as there are different Branches and Surfaces, whereinto, these are dispos'd: Add also, that the sharp Edges of these *Lamina* being toward the Air, they are more capable to divide the *Columna Aeris* suck'd in by the Nose, and give a greater tension to the Nervous Filaments dispers'd in them; whereby the Sensation is communicated the more lively to the *Sensorium Commune*;

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and 'tis observable, that such Creatures as have most of these *Lamina* have their Smelling the more acute. Now this Structure is only to be seen in those Animals, whose *Septum intermedium* and two sides of the Nose consist of Bones, at least so far as their *Lamina* are extended; but it fares otherwise with our *Elephant*, whose *Os Ethmoides* is very thin, and has no *Lamina Spongiosa* adhering to its outside, nor a Bone for the *Septum*, or Sides to guard these *Lamina*, which would have been inconvenient, for then the *Proboscis* could not have mov'd with the same Facility, e'en from its Root, as it doth. Therefore to supply this defect, and still to continue the Smelling so acute, if not more in this than in many other Animals, 'tis provided, that the *anterior Fossa* should be very deep, that the Production of the Brain in it might be the greater; and lest its Surface should still be too small, there should be eminent Lines both in the *Vomer* and throughout the rest of the Bone, that there might still be more space for branching out the Nerve, as it proceeds from its Origin. There may also be another Reason alledg'd for these protuberances, viz. because the Brain is more pendent here than elsewhere, they may serve as so many Columns to support it, lest by its Weight it should lean too much upon the *Os Cribrosum*, so that the Origin of the *Nervus Olfactorius* being too much press'd, instead of a clear, might afford a very confus'd Idea of Smelling; and, that even within the Scull it may be so divided and dispers'd in this Animal, as it useth to be without it in others: So that the defect of the *Lamina Spongiosa* without, is supply'd by this diversity of Perforations and Eminences in the *Os Cribrosum* within. Indeed in Horses there is somewhat of this Structure to be observ'd. The *Os Cribrosum* seems to be proportionally as large; its Perforations as frequent; and the *Lamina Spongiosa* without, both few and thin set; by which that Creature has but an ordinary Sensation of Smelling, and only such as is convenient for the choice of its Food; because the *Nervus Olfactorius* has not such a space wherein to be dispers'd, as the *Septum* and Cartilaginous Sides of the *Proboscis*; which is so great, that scarce can a Particle of any odoriferous Substance escape the touching of some one or other of the Nervous Filaments: Whereas in Horses, there being but a short space betwixt the *Os Cribrosum* and the Nose, the additional Surfaces of the *Lamina Spongiosa*, and the tension of the Bone of the Nose on both sides, otherwise than in the *Elephant*, who has no Bone there at all, are very convenient to supply that defect; for you know

know the more extended a Nerve is, the greater is its Sensation, and a Bone is fitter for tension than either a Cartilage or other soft Substances are. The *anterior Fossa* (*b. b.*) is from the Right *Anterior Fossa of the* to the Left 8 Inches, and from before to the *Nervus Opticus* behind 4 $\frac{1}{2}$ Inches, and of depth, *i. e.* streight down from the *Sella Scull.* *Turcica*, or in the middle betwixt the foresaid Holes to the bottom of the *Os Ethmoides* on each side, 2 $\frac{1}{2}$ Inches The two mid. *Middle Fossæ.* *Fossæ* are bounded before by the two *anterior Eminences* (*e. e.*) and behind by the two *Processus Petrofi* (*s. s.*) The Seat of the Brain is here 12 Inches Diameter (*r. r.*) In the Center between the two *anterior Processes* is the first Pair of Holes (*f. f.*) at an Inch distance. These run obliquely between two small Eminences, where the *Glandula Pituitaria* was lodg'd, call'd the *Sella Turcica* (*u.*) *First Pair of Holes.* and these two *Processes* are call'd in Human Subjects *Clinoides*. This Pair of Nerves runs obliquely downward 6 Inches, and passes out below the *Lamina* on each side of the Head (*s.*) which *Fig. 2.* frames the upper Edge of the *Sinus* for the Globe of the Eye, being the second Pair, call'd the *Optick Nerves*. These two *Processes* running $\frac{1}{2}$ Inch back on each side, at the same distance afford two more Holes passing in below them, which could not be shewn *Second Pair.* in the Figure; this is call'd the *Foramen lacerum*, and through it pass the third Pair, or *Oculorum Motorij*; the 4th Pair, or *Pathe-* *Fig. 14.* *tici*; the *Ophthalmic*, or first Branch of the 5th Pair, and all the sixth Pair (*g. g.*) The third Pair of Holes is at the back of the *Third Pair.* two *anterior Eminences*, betwixt the first Pair and the External Part of the Seat of the Brain, 4 Inches distant from each other (*b. b.*) They are the largest of all those in the bottom of the Scull, except that for the Spinal Marrow, and have a peculiar Use, which is at large declared, Pages 82 and 83, when speaking of the Vessels and Nerves of the *Proboscis*; *viz* that they are for the transmission of the *superior* Branch of the second Division of the 5th Pair of Nerves, and a Branch of an Artery which proceeds from the *Arteria dura Matris* (*k. k.*) being separated from it by the boney *Septum*, which passes betwixt it and the Hole for the third Branch of the 5th Pair (*i. i.*) runs along the *Crena* (*x. x.*) and passes out with the foresaid second Branch (*g. g.*) The fourth *Fourth Pair.* Pair of Holes then is for the Egress of the third Branch of the 5th Pair (*i. i.*) and Ingress of a Branch from the *Arteria dura Matris*; and the 5th Pair is for the *Arteria dura Matris* itself *Fifth Pair.* (*k. k.*) The sixth Pair is for the Carotid Artery (*l. l.*) which is *Sixth Pair.* otherwise situated here than in Human Subjects; for in them it

is betwixt the *Processus Petrosus*, and two posterior *Processus Clinoides*; whereas here 'tis betwixt the *Processus Petrosus* and Center of the Base of the Scull, on each side about 3 Inches distant from each other. The seventh Pair is for the *Nervus Auditorius* (*m. m.*) being situated in the *Processus Petrosus* (*S. S.*) And here 'tis observable, that from the side of the Hole where the Carotid Artery (*l. l.*) passes toward the *Os Petrosum*, there is an Hole which runs about $1\frac{1}{2}$ Inch outward, forms an Angle, and then passing by the Sides of the *Cavitas Tympani* (*e.*) runs streight downward and penetrates the Scull (*l.*) This I take to be the Hole for the hard Portion of the *Nervus Auditorius*, which does not here as in other Animals, pass in at the Hole of the *Processus Petrosus* with the soft Portion; but as it proceeds from the Brain, goes along the Sides of the Carotid Artery to this Hole. This hard Portion, as I told you, was much bigger as we trac'd it running forward above the Temporal Muscle, and going to the upper Lip

Seventh Pair. to be afterward dispers'd in the *Proboscis*. The eight Pair is for the Internal Jugular Vein, and *par vagum*, which passes out at the same Hole (*n. n.*) And the Ninth *Impar*, is for the Spinal Marrow; of which already. And thus we have given an Account of all the Parts of the inner Surface of the Scull. Now we come to the Consideration of

Eighth Pair.

A Hole for the Spinal Marrow.

The *Ear*, whose Parts are, 1st. The *Meatus Auditorius*, or that *Duct* which runs from an Orifice on each side of the Head

Tab 3. Fig. 2. (k) whereof formerly, to the inner Table of the Scull, terminating in the *Os Petrosum* (*S.*) being of a Cylindrical Figure (*b. b.*) having the *Cellules* arising from it on all sides (*c. c. &c.*) 'Tis in length from the External Orifice to the *Crena* for the *Membrana Tympani* (*b.*) $9\frac{1}{2}$ Inches, and about 1 Inch Diameter throughout the whole Extent. Its Sides are compos'd of a firm solid Bone, and little thicker than an Halfpenny. Next is observable the *Crena* for the *Membrana Tympani*, in Circumference 2 Inches $\frac{1}{2}$: After which is to be seen the *Cavitas Tympani*, consisting of two Parts; the first whereof (*c. c.*) is $\frac{1}{2}$ Inch deep, streight down from the foresaid *Crena*, endued with a great many *Cellules*, distinguish'd from each other by several osseous solid *Lamina*, irregularly dispos'd, which could not be so well represented in the Figure. These Excavations were about two or three Lines, or $\frac{1}{2}$, or $\frac{1}{4}$ Inch deep. The next Cavity (*d.*) is of a Surface more smooth, arises much higher than the former, and runs toward the outer Table, having several Semicircular Lines running across.

Fig. 13.

Fig. 12.

Fig. 10.

across. The first Cavity is from the Right to the Left $1\frac{1}{2}$ Inch, and from before to behind $1\frac{1}{4}$ Inch. The second Cavity 1 Inch in length, and $\frac{1}{2}$ inch at its broadest part. The *Officles*, viz. the *Malleolus* (a) *Incus* (b) *Stapes* (f.) are of a proportional bigness, as you see in the Figure, where they are shewn in their true Dimensions, running from the *Malleolus*, which touches the *Membrana Tympani*, to the *Basis* of the *Stapes*, which shuts the *Foramen Ovale* (c.) It has but a small *Cochlea* in proportion (d.) whereinto a Branch of the Soft Portion enters, and another Branch of the said Portion goes into the *Cavitas Tympani*, whose upper part is covered by the lower side of the *Os Petrosum* (b. b.) I was at some Pains to file down a great part of the *Os Petrosum*, where I observ'd how the Hard Portion pass outward from the Hole for the Carotid Artery, as is said, and how the Soft Portion after it had entred the *Processus Petrosum* (e.) did divide it'self into these two just now mention'd Portions, to the *Cochlea*, and *Cavitas Tympani*. I search'd for the *Labyrinth*, or *Lineæ Semilunares*, but could find none; by which I concluded, that these Caverns in the bottom of the *Cavitas Tympani* did serve for the same Uses in this Animal, as the *Meanders* of the *Labyrinth* do in others; and that this second Cavity did serve for receiving and continuing the Undulations of the Air, for the longer retaining of the Sound, as we see the cavous *Apophysis Mastoidea* does in Sheep, Cats, Dogs, &c. and the spongy one in Men. The *Foramen Ovale* is but little, and the *Base* of the *Stapes* very thin and slender (h.) whereby I suppose the Sensation of Hearing is rather perform'd by the Vibrations of the Air upon the *Cavitas Tympani*, than by any assistance it had from the *Cochlea*. The upper part of the *Septa* which circumscrib'd the Caverns in the *Cavitas Tympani*, is thicker, and the lower part very slender; and I doubt not but they communicate with one another by several *hiatus*, whereby what humidity is in the bottom of the Caverns may be convey'd from each other, till it come to the Orifice of the *Aqueduct* parallel to it, and thereby discharge it into the Mouth; for the boney part of this *Aqueduct* descends in a straight Line, from the fore part of the bottom of this *Cavitas Tympani* $5\frac{1}{2}$ Inches flat, being from the Right to the Left about $\frac{1}{4}$ Inch, and from before to behind 3 Lines, or $\frac{1}{4}$ of an Inch. I am sorry I did not know the *Os Petrosum* would so easily separate for I might have observ'd more narrowly the Structure of the Ear before the Scull was boild; and tis by an accidental Separation of this

Bone, after the Head was taken out of the Caldron, that I have now come to give this Account of it.

From the Head we go to the Trunk, which consists of the Spine, Ribs, and *Sternum*. The *Spine* is divided into the *Vertebra* of the Neck, Back, Loins, *Os Sacrum*, and *Pail*. The *Vertebra* of the Neck differing from each other in several things material, I shall speak of them separately: Whereof

The first
Vertebra of
the Neck.
Tab. 4. Fig.
1.

A.

A. 1.

The second.
A. 2.

The first call'd *Atlas*, has four considerable Cavities; two at the fore part (*b. b.*) whereby it receives the *Condyles* of the Scull, and two at the back-part (*c. c.*) whereby it receives the Base of the following *Vertebra*; the first two are $2\frac{1}{2}$ Inches from above to below, and 2 Inches from the Right to the Left. It has a large Hole in the middle, divided into its larger part (*a.*) 3 Inches Diameter, which is for receiving the Spinal Marrow, and Lesser, which receives the Tooth of the following (*b.*) Four Perforations, or two Pair of Holes at the Sides; one at its lower and fore-part (*c. c.*) which receives the *Arteria Cervicalis*, or *Vertebral*is from the side of the Spinal Marrow, and conveys it to a *Crena* (*e. e.*) along which it runs, till it again penetrates the same Bone (*d. d.*) and goes out at the back part; after which in its Progress it perforates all the transverse Processes of the rest of the *Vertebra* of the Neck, as is usual in other Animals. This *Crena* is guarded on its outside, or at the Extremity of the transverse Processes by a Protuberance, which runs toward the Scull $1\frac{1}{2}$ Inch (*a. a.*) till it be equal to the Sides of the Hole for the Spinal Marrow. At its upper and fore-part it inclines obliquely (*f.*) where 'tis 3 Inches thick, and at its lower and back-part (*e.*) it has a Protuberance which is extended where it embraces the Tooth. This *Vertebra* is in Diameter 12 Inches (*a. a.*) The transverse Processes are in breadth from above to below 2 Inches, and in length at their lower part 3 Inches.

The second *Vertebra* has remarkable in it, 1st. A large Protuberance called the Tooth (*d.*) which is received by an Hole in the former, and serves as an Axis upon which the Head is turn'd round. This Tooth runs forward from the Body of the *Vertebra* 2 Inches above, and $2\frac{1}{2}$ Inches below, tapering and terminating in an obtuse Point. 2. A large Protuberance arising from its upper and middle part (*a. a.*) (like the *Processus Spinosus* in others, 4 Inches from the beginning of the transverse Processes, two Inches broad at the top, terminating in two obtuse Points, with a *Sinus* (*b.*) larger at the back than the fore-part) in the middle.

This

This Protuberance inclines forward toward the first *Vertebra*.
 3. Its Body or back part, and Base of the Tooth (*f.*) transf. B. 2.
 versely $4\frac{1}{2}$ Inches, perpendicularly 4 Inches. 4. Two oblique
 Processes, by which 'tis articulated with those of the following,
 and betwixt which there are 4 Inches (*b. b.*) 5. Two transverse
 Processes (*g. g.*) each 2 Inches long. At its fore part on each
 side of the Tooth (*d.*) are two Protuberances (*e. e.*) which are
 received by the two hind Cavities of the first *Vertebra*. This *Ver-* A. 2.
tebra is two Inches thick from before to behind, the Hole for the
 Spinal Marrow 2 Inches Diameter, those for the Cervical Artery
 (*f. f.*) $\frac{1}{2}$ Inch Diameter. Between the oblique and extremity of
 the transverse Processes, 'tis 6 Inches.

The third and fourth *Vertebra* differ from this, 1st. In their *The third*
 four oblique Processes (*e. e.*) viz. two by which they are artic. and fourth
 lated with the preceding, and two with the following, which *Vertebrae*.
 is common to those of the Neck, Back and Loins. 2. In their A. 3. A. 4.
 Convex Body before (*b. b.*) and concave behind (*c. c.*) where they
 are receiv'd by, and do receive the preceding and following,
 which is also common to the other *Vertebra*. 3. In their Eminences
 at the Top (betwixt the oblique Processes) at $4\frac{1}{2}$ Inches di-
 stance (*e. e.*) betwixt which there is a Depression in the third,
 and a small Protuberance in the midst of this Depression in the
 fourth. Their transverse Processes (*f. f.*) are 2 Inches broad at
 the Extremity, from which they descend obliquely 3 Inches, having
 a Protuberance on each side, betwixt which and the Body of the
 preceding *Vertebra* (*b. b.*) does proceed a Branch of the Cervical
 Artery, which it continues to do from betwixt all the other *Ver-* Fig: 3.
tebra of the Neck, till it comes to betwixt the Seventh of the
 Neck and first of the Back, where 'tis wholly spent. Betwixt
 the oblique Processes (*e. e.*) and transverse (*f. f.*) it is 4 Inches.
 The Hole for the Cervical Artery (*d. d.*) is here Oval. The
 Bodies of these *Vertebra* are thinner below than the former :
 They are 4 Inches in Diameter, being of the same Dimensions
 with all the other *Vertebra* of the *Spine*, till you come to the *Os*
Sacrum. Those in the Neck are more flat before, and those in
 the Back more Protuberant. Besides those *Sinus*'s in the inside
 of the fore-mention'd Protuberances in the Neck, there is like-
 wise a *Sinus* betwixt the transverse Processes of each *Vertebra* and
 its Body, throughout the whole *Spine*, for transmission of the
 several Conjugations of Nerves from the Spinal Marrow.

The fifth. The fifth *Vertebra* is of the same Dimensions with the other two, and differs in nothing from them but by its Spinal Process, which from $\frac{1}{2}$ Inch in the former arises to $1\frac{1}{2}$ in this, being $\frac{1}{2}$ Inch broad, and thin at the Extremity.

The sixth. The sixth *Vertebra* differs from all the rest in its transverse Process, which is as far forward as the rest, and sends out another Process which runs a backward; so that from the Extremity at the fore-part to that at the back-part, 'tis 3 Inches. It also sends another Protuberance obliquely outward $1\frac{1}{2}$ Inch (*i. i.*)

Fig. 3. At this Process the Cervical Artery passes out from the transverse Process of the *Vertebra*, and only send a Twig to the

The seventh. Seventh *Vertebra*, or last of the Neck, which differs from all the rest, 1st. In the length of its Spinal Process, which is augmented from 3 Inches in the former to 5 in this (*g. g.*) 2. In the smallness of the Hole for the Cervical Artery (*d. d.*) this being the last perforated transverse Process, as is said. 3. In a *Sinus* on each side of its Body behind (*i. i.*) whereinto it receives part of the first Rib.

The Thorax. The *Thorax* is divided into the *Vertebrae*, *Ribs*, and *Sternum*: There are 19 *Vertebrae*, correspondent to so many Pair of *Ribs*; they differ nothing from the former, except that their Body is more Protuberant, that their Spinal Processes are augmented and diminished in their length, according to their Situation, and that they have a *Sinus* in each side, both before and behind, for Reception of their respective *Ribs*: For the Weight and Dimensions of their Spinal Processes see the following Table.

Ribs. The *Ribs* are divided into the true (which are articulated with the *Sternum*) and false ones, with and without Cartilages. There are 8 Pair of true *Ribs*, 8 Pair false with, and 3 without Cartilages. The Cartilages here are soft, as in Human Subjects, and not boney, as in Oxen, Harts, &c. The length of the *Ribs* both from the one Extremity to the other, and along their inner Surface, that you may the better know how much they are bended, with their breadth at the Extremity and Weight of each Pair, shall be given in the following Table.

Sternum. The *Sternum* consists of four Bones; they are plac'd edgewise, being two Inches thick above, and sharp below: From the fore-part to the Point of the *Cartilago Enstiformis* 'tis 25 Inches; whereof the first is 88 Inches long, and $4\frac{1}{2}$ Inches broad at the Articulation of the first Rib; the second $4\frac{1}{2}$ Inches long, and 3 Inches broad; the third $3\frac{1}{2}$ Inches long, and 3 Inches broad; the 4th

4 Inches long, and $2\frac{1}{2}$ Inches broad; the rest of the length is made out by the *Cartilago Ensiformis*.

The *Loin*s consist of three *Vertebrae*, whose Spinal Processes are but short; their transverse Processes a little longer than those in the Back; which beside their Weight, (for which see the Table) is all that is material about them. *The Vertebrae of the Loins.*

The *Os Sacrum* consists of five Bones; they are of a flat Surface before (B) each having three Processes (*viz.* two oblique, and one Spinal, under which the Spinal Marrow descends) behind. They are perforated before by 4 Pair of Holes, plac'd at their Interstice on each side. It is 12 Inches long and $7\frac{1}{2}$ broad, where 'tis articulated with the *Ossa innominata* above, and 6 Inches broad at the lower part. See Fig. 4 and 5. *Os Sacrum. Tab. 4. Fig.*

The *Tail* consists of twenty nine *Vertebrae*, whose differences are to be seen in the following Tables. From the *Os Sacrum* to the Eight they have five Processes, *viz.* two transverse, two oblique, and one Spinal, under which the Spinal Marrow descends, sending forth a Conjugation of Nerves from betwixt each of them. From the Eighth to the Sixteenth each has 4 Processes, *viz.* two longitudinal behind, betwixt which the remainder of the Spinal Marrow still descends, and two transverse: The rest have no Process at all, but are of a kind of quadrangular Figure, having a Ridge which descends before and behind, and on each side; being somewhat bigger at each end, and smaller at the middle. All the *Vertebrae*, as well in the Neck and Back, as Tail, had Cartilages, which run betwixt each of them; they were about $\frac{1}{2}$ Inch thick in the Back, thinner in the Neck, and thicker proportionably in the Tail. These Cartilages I was oblig'd to supply with Leather in mounting the Skeleton, as shall be shewn. So much for the Trunk. *The Vertebrae of the Tail.*

Because this is a Quadruped, we shall divide the Extremities into the fore and hind ones. We begin the fore Extremities at the *Scapula*, which is usually divided into its Head, Neck, Spine, Processes, fore and hind Cavities, (*i. e.* these Parts before and behind the Spine) its concave part, which lies upon the Ribs, and its convex or outer part, and its Margin. The Head (*a.*) which receives the *Os humeri*, is oblong, (because the motion of the *Humerus* perform'd by this Animal, is rather Flexion and Extension, than Adduction or Abduction) wherefore the Cavity being $5\frac{1}{2}$ Inches long, is only $3\frac{1}{2}$ Inches broad, and the Margin of the Bone arising from the fore and back-part (*b. b.*) makes it

2 Inches deep ; for at the sides the Margin is equal to the Cavity. At the back-part there are two Processes ; that which regards its convex part is 2 Inches long, rugous, thick and obtuse ; that which regards the concave, runs two Inches backward, where it forms an obtuse Angle , whence it ascends 3 Inches to the Neck : This has a sharper Edge than the former, being somewhat incurvated. Betwixt these two Processes is a rugous *Sinus* two Inches broad, ascending from the Cavity of the Head 3 Inches to the Neck, and rising somewhat in the middle of its Progress. The Neck (*c. c.*) is flat, being more obtuse at its back-part, and where is the last nam'd Protuberance, and sharper at its fore, where is a little Protuberance toward the *Spina* on the convex side, being more plain on the concave. Betwixt the first of the fore-nam'd Protuberances (*b.*) and the *Spina*, there is a *Sinus* which ascends 4 Inches (*d.*) and from the same Protuberance (*b.*) to the Extremity of the *Processus Coracoides* (*e.*) is $3\frac{1}{2}$ Inches. This *Processus Coracoides* is that part of the *Spina* (*e.*) which runs toward the Neck of the *Scapula*, but does not, as in Men, defend the *Humerus* from Dislocation. 'Tis very rugous and convex before, but concave at its back part, being $3\frac{1}{2}$ Inches broad at the Point it ascends 11 Inches, where 'tis rais'd 5 Inches from the Body of the *Scapula* (*f.*) it inclines a little backwards and ascends 12 Inches more, till it be lost where the *Epiphysis* begins (*g.*) being still concave at the fore, and convex at the back-part. From the *Spina* (*f.*) it sends forward a Production 8 Inches long (*h.*) 3 Inches broad at its upper part, two Inches about the middle where 'tis crooked, and $1\frac{1}{2}$ Inch at its lower Extremity where 'tis thin and sharp ; but at its upper part thicker and rugous, concave at the inner, and convex at the outer side. This Process serves to keep the *Musculi supra-spinati* within their bounds, when they pull up such a vast Weight as the fore Leg. As the *Spina* runs up 5 Inches from this Production, 'tis rugous and thick in its edge, from thence it becomes gradually thinner till it comes to the *Epiphysis*. The Back and upper part of the *Scapula* is very thin, and sharp from the Neck (*c.*) 16 Inches upward to (*m.*) from thence it ascends 5 Inches to the place where the *Spina* ends, and forms a very rugous and spongy *Epiphysis*, thick at the upper end (*l.*) thence it descends obliquely two Foot (*i.*) whence its fore edge runs obliquely in toward the Neck 10 Inches, being sharp ; thence it tends outwards and descends other 5 Inches till it comes to the Neck. All the upper part of the

Scapula

Scapula from (*m*) to (*l*) where 'tis thickest, and from (*l*) to (*i*) where 'tis thinner, except towards its lower part, is covered with an *Epiphysis* (as is said) spongy and rugous, which separated by the boiling, and is a further Argument that this Animal was Young, according to their term of Life; 'tis otherwise a very thin Bone and solid, except where the *Epiphyses* are.

The *Humerus* is a very irregular Bone; it's Head is in Cir-^{The Hume}cumference 2 Foot, having 2 remarkable *Epiphyses*, one whereby ^{rus.}'tis articulated with the *Scapula* from before to behind with a convex Surface 8 Inches, and from the right to the left $4\frac{1}{2}$ Inches, and another on the outside rising higher and sharp about $1\frac{1}{2}$ Inches. Round this *Epiphysis* is 11 Inches, and from before to behind with a flat outside $6\frac{1}{2}$ Inches. Betwixt the *Epiphysis*, which receives the *Scapula*, and this Protuberance is a *Sinu* about $3\frac{1}{2}$ Inches broad, and about $1\frac{1}{2}$ Inches deep; as it descend toward the inside it becomes deeper, and only 2 Inches broad: 'Tis for lodging the external Tendon of the *Biceps*, analogous to a *Crena* for the same purpose in human Subjects. The Neck of the *Humerus* is in Circumference 19 Inches, flat behind for the space of 4 Inches, then forming an Angle, and running obliquely outward 3 Inches, then passing forward below the utmost Protuberance 5 Inches, thence crossing the forenam'd *Sinus* it runs back, first flat, then a little convex, 7 Inches. Below this outward Protuberance there is a rugosity for the Insertion of the *Flexores Cubiti* $6\frac{1}{2}$ Inches long, and $3\frac{1}{2}$ Inches broad at the upper part, and thence descending gradually it terminats in a Point. At the lower part of this rugosity the Bone is $13\frac{1}{2}$ Inches in Circumference, having 3 Faces; one at its Back part 5 Inches broad, somewhat depress'd from the inside, then a little Protuberant, as it tends outward; a second on the outside, and 4 Inches broad; and the third on the inside, $4\frac{1}{2}$ Inches broad, flat also. Here begins another considerable rugosity, small and oblique from the back part of the utmost Protuberance of the *Humerus*, and becoming very rugous at this Place, continuing 6 Inches obliquely downward, and 2 Inches broad about the middle. At the lower part of this rugosity the Bone is 18 Inches in Circumference, with its three Faces otherwise disposed; that which was before terminated in an obtuse *Spina*, and where it was an obtuse *Spina* behind, now becoming flat. On the outside begins a considerable *Sinus*, being the Continuation of the *Sinus* formerly mention'd betwixt the *Epiphyses* *Humeri* and outer

Pro;

Protuberance, whence in its descent the Bone became depress'd; and now the *Sinus* is conspicuous (3) being fram'd by an obtuse *Spina*, descending obliquely forward from the fore-said rugosity on the one side, and another obtuse *Spina* descending obliquely outward on the other. This *Sinus* (2) is 1 Inches broad from before to behind; thence measuring backward the Bone is flat $3\frac{1}{2}$ Inches; measuring from thence on the inside, the Bone having form'd an obtuse Angle, is $5\frac{1}{2}$ Inches flat also. The *Spina* on the fore side, after it has descended $5\frac{1}{2}$ Inches, the Bone becomes flat; that on the outside terminating in a considerable Protuberance, $4\frac{1}{2}$ Inches long, where the Bone has only two Faces, convex before and concave behind, and 17 Inches round. Behind its fore-said outward Protuberance is 7 Inches; it becomes $1\frac{1}{2}$ Inches depress'd in the middle, where the *Sinus* for receiving the *Cubitus* begins. From the fore-said external Protuberance it descends in a streight Line 8 Inches, and from its opposite part at the inside it descends obliquely backw'rds 5 Inches; and here the lower *Epiphysis* begins, where 'tis receiv'd by the *Cubitus* and *Radius*. This *Epiphysis* is 1 Foot $10\frac{1}{2}$ Inches round being 10 Inches thick at the outside and flat, and 7 Inches at the inside and Protuberant; betwixt which behind is a considerable *Sinus* $5\frac{1}{2}$ Inches broad, and $2\frac{1}{2}$ Inches deep, and before, another *Sinus* 7 Inches broad, of the same disposition. This *Epiphysis* is at its lower extremity and inside, where it receives the *Cubitus*, $5\frac{1}{2}$ Inches from before to behind; of a convex Surface and 6 Inches at its outside, where 'tis receiv'd by the *Radius*. At its fore part the *Sinus* is not very considerable, but at its back part deeper and narrower for receiving the *Olecranon*. At the extremity of the *Epiphysis*, 'tis narrower, being only 6 Inches from the right to the left before, and $7\frac{1}{2}$ Inches behind. And thus you have an Account of the most irregular Bone of the Body, being at its external part 20 Inches in length, and 26 at its internal; having a large Head consisting of an *Epiphysis* receiv'd by the *Scapula*, a large Protuberance on the outside defending it from Dislocation, and a *Sinus* betwixt the two reaching a good way back, thence descending to its Neck, whence the Bone becomes flat (2) to about the middle, descending on the outside, flat also, with two rugosities for the Insertion of the Tendons. Betwixt this outside and back part, is a very large *Sinus* for the *Biceps*, which oblique situation (3) is an admirable contrivance for adding Strength and conciliating length to this Muscle. Now the shape of the Bone begins to be chang'd,

chang'd, for whereas it formerly reach'd from before to behind, now it reaches from the right to the left, and its lower extremity (4) becomes broader, whereas at its upper extremity it was rounder.

The *Cubitus* and *Radius* are two Bones of a singular Figure, the one lying above the other: We shall begin with the *Cubitus*, which is in length from the top of the *Olecranon* to its Articulation with the Bones of the *Carpus* (5) 28 Inches. The *Olecranon* (1) from the right to the left, with a Surface somewhat convex, is $9\frac{1}{2}$ Inches; and from before, where it is articulated with the *Humerus*, to its utmost point behind, in a streight line 7 Inches. This *Olecranon* as it descends, becomes narrower by degrees, till it forms a *Spine*, which runs obliquely forward 13 Inches, where 'tis contracted from the fore-said $9\frac{1}{2}$ Inches to 3 in breadth. Afterwards the Bone is enlarg'd on each side, till it forms a convex Surface, which is received by, and articulated with the *Humerus*. This Articulation is a *Ginglymus*, as in all other Animals; viz. the *Cubitus* and *Radius* together receive the *Humerus* on the outside before, which on the inside the *Cubitus* doth alone. Berwixt these two is a large Protuberance rising $2\frac{1}{2}$ Inches, which is also received by the *Humerus*. Measuring from the extremity of the *Cubitus* and *Radius*, which receive the *Humerus*, on the outside to its opposite part on the inside, including the back part of the *Olecranon*, it is 10 Inches. Both the Bones from the right to the left, at the articulation before, are 7 Inches. Then measuring round the *Cubitus*, below the Articulation, is $16\frac{1}{2}$ Inches. Here the Bone is flat before, from the right to the left 7 Inches; from thence obliquely backward to the forementioned *Spine* beneath the *Olecranon* is 5 Inches on the outside, and $6\frac{1}{2}$ on the inside. At the lower part of the fore-said *Spine* the *Cubitus* is in Circumference 11 Inches; viz. flat before 4 Inches, where it forms an Angle; thence running obliquely backward 2 Inches, forming another Angle; thence $1\frac{1}{2}$ Inch obliquely backward, where 'tis a little Protuberant; and from thence obliquely inward $3\frac{1}{4}$ Inches. Round the lower extremity of the *Cubitus*, and 3 Inches above the *Epiphysis*, it is 12 Inches; viz. from the *Radius* $2\frac{1}{2}$ Inches; thence obliquely outward, with another flat Surface, $3\frac{1}{2}$ Inches; and from thence, with a convex Surface, round the back part 6 Inches. The *Cubitus* at the *Epiphysis*, from the *Radius* on the fore part to its opposite side on the back part, is 13 Inches; from the upper part of the lower *Epiphysis*, where 'tis articulated with the external Bone of the *Carpus*, obliquely in-

ward is 5 Inches. This same *Epiphysis*, with a convex Surface behind, from the right to the left is 5 Inches.

Radius.

The *Radius* in length, from the external and upper part of the *Cubitus*, on which it lies, and with which it is united, running obliquely inward, is 1 Foot 9 $\frac{1}{2}$ Inches. At its upper part it sends a Production outward 3 $\frac{1}{2}$ Inches, by which, with a part of the *Cubitus*, it receives the external part of the lower *Epiphysis* of the *Humerus*: From thence the Bone is contracted at its fore part to 2 $\frac{1}{2}$ Inches; then descending 10 $\frac{1}{2}$ Inches, it becomes 2 $\frac{1}{2}$ Inches broad; thence it enlarges gradually till you come to the lower *Epiphysis*, where measuring from the fore part of the *Cubitus* to its opposite and back part, the *Radius* is 8 $\frac{1}{2}$ Inches; thence you descend 3 Inches, to its articulation with the internal Bone of the first rank of the *Carpus*. This Bone is quadrangular above, descending to about the middle it becomes more convex; from thence it is gradually enlarged, and during the whole Progress pretty free from the *Cubitus*, except where 'tis conjoin'd with it at its upper part: At the lower articulation, the one is only separated from the other by a Cartilage. The lower *Epiphysis* of these Bones is of a very unequal surface, and though not separated from them by boiling, yet plainly distinguish'd by their Cartilages, which are not yet Ossified.

The Fore Foot (as the Hand in human Subjects) consists of the *Carpus*, *Metacarpus*, and Fingers, or rather Toes. The *Carpus* has 6 Bones dispos'd into 2 Ranges, differing in Figure from each other, rugous before, endued with several Holes for transmissiion of Blood Vessels, and of a convex Surface behind, having several inequalities for Insertion of Tendons.

External
Bone of the
first Rank.
Tab. 4. Fig. 8.

The External Bone of the first Rank (1) is an irregular Bone, running forward with a convex Surface, till it meets with its Copartner, 5 $\frac{1}{2}$ Inches; passing in a more direct line 3 $\frac{1}{2}$ Inches behind. It has 3 Faces: Its upper View, in the Figure, whereby it is articulated with the *Cubitus*, from behind to before is 2 $\frac{1}{2}$ Inches, from the right to the left 3 $\frac{1}{2}$ Inches. At the fore part it has a Prominence which is receiv'd by the *Cubitus*, from which the Bone declines as it runs backward, and forms a depression about the middle, rising higher at the hind part. At each side, on the right and left, it receives the *Cubitus* by two Superficial *Sinuses*. Its Second Face, whereby it is receiv'd by the second Bone of this Rank, runs from before to behind 2 $\frac{1}{2}$ Inches. It is very narrow, and only touches its Copartner of the lower part; for betwixt this

this and the other is a small Cavity, whose Surface compos'd by both Bones is unequal for the Infertion of Tendons, and perforated with several Holes for immiffion and egress of Blood Vessels: Its lower Surface is articulated with the outer Bone of the second Rank by a *Ginglymus*; i. e. behind it has a *Sinus* for receiving that below it. About the middle it has a small Prominence which is receiv'd by the other, and both are conjoin'd by a plain Surface behind. From before to behind it is 3 Inches, and from the right to the left 4 Inches, being $1\frac{1}{2}$ thick. It has three Protuberances; one larger at its outside, more obtuse; one lesser below that more sharp, extended a little further to cover a part of the outer Bone of the second Rank; and a third on its inside towards its Co-partner: Besides these, it has another small Face at its upper and back part, which runs 2 Inches from the right to the left, and $\frac{1}{2}$ Inch from above to below, being also conjoin'd obliquely with the back part of the *Cubitus*. This Bone weighs 6 $\frac{3}{4}$.

The second Bone of the first Rank (2) is of the same thickness with the former, being articulated with the *Radius*; it is 3 Inches from the right to the left before. At its middle it has a *Sinus* on each side; one towards the former, making up with it the forenam'd Cavity, the other on its opposite side, where it receives the third Bone of this Rank; so that here 'tis only 2 Inches Diameter, and further back but $1\frac{1}{2}$ Inch; From behind to before it is 3 Inches, and behind 'tis articulated with the *Radius* by a *Ginglymus* also, for before 'tis received by a small Production of the *Radius*; about the middle it receives the *Radius*. This Bone weighs 5 $\frac{3}{4}$. The Second

The third Bone of this Rank (3) is only articulated with the former at the side, where 'tis receiv'd into the forenam'd *Sinus*, above which it is also receiv'd by the *Radius*. It runs $1\frac{1}{2}$ Inch higher than the former, and as much lower; so that it is $4\frac{1}{2}$ Inches from above to below, making up almost the whole inside of the *Carpus*. It terminates above in an obtuse point, from thence it becomes still broader, so that 'tis 3 Inches from above to below. At its lower part it rests upon the second and third Bone of the second Rank: It weighs 3 $\frac{3}{4}$. The Third

The first Bone of the second Rank (3) in its fore and outer side follows the same Progress with that above, being 6 Inches from behind to before, where 'tis conjoin'd with its Partner; and from before, at the Articulation with its Partner, to behind 4 Inches; from the right to the left behind, where it is broadest, 3 Inches. The first Bone of the second Rank.

Its Surface behind is unequal for the reception of Tendons. It is articulated above with the first Bone of the first Rank, and with 3 Bones of the *Metacarpus* below; and at its inside with its Partner of the same Rank. Its articulation above is *per Ginglymum*, as is said; *i. e.* before and behind 'tis receiv'd by that above, and at the middle it receives it: It is $2 \frac{1}{2}$ Inches thick before. It weighs 6 $\frac{3}{4}$.

The second

The second (4) which is much like to it, as being received by the second above after the same manner, is 3 Inches on its convex Surface, and $2 \frac{1}{2}$ Inches transversely at its middle. At its outside, being the inside of the Foot, it mutually receives the

The third

Third (5) which runs obliquely backward 2 Inches from the former: It has four Surfaces for Articulation; one where 'tis join'd with the third Bone of the former Rank; the second where it is join'd with the last nam'd Bone: In conjunction with the former it receives the 3rd Bone of the *Metacarpus*; and at its outside the 6th. It terminates in an obtuse point behind, and has a *Sinus* betwixt the Articulation of the Bone of the *Metacarpus* and its extremity.

The 2^d weighs 6 $\frac{3}{4}$, and this 4.

*Bones of the
Metacarpus,
Tab. 2. C. 8.*

There are Six Bones in the *Metacarpus*, *per Ginglymum longum*; *viz.* they are receiv'd above by the Bones of the second Rank of the *Carpus*, and below by the Toes. They are all of much about the same Figure, but not of an equal length; somewhat flat before, and both convex behind; broader at the upper and lower extremity where they touch one another, and narrow in the middle.

The first on the outside is 3 Inches long, and $4 \frac{1}{2}$ Inches round its middle, and articulated with the external part of the outer Bone of the second Rank of the *Carpus*; in weight 3 $\frac{3}{4}$.

The second is 4 Inches long, and $5 \frac{1}{2}$ Inches round its middle; flat before, and more convex behind; and articulated with the middle of the foresaid Bone of the *Carpus*. It weighs 4 $\frac{3}{4}$.

The third is 5 Inches long, flat also before, and 7 Inches round its middle; articulated with the foresaid Bone of the *Carpus*, and occupying most of its inner Surface. It weighs 6 $\frac{3}{4}$.

The 4th is 5 Inches long, and 6 round its middle. This occupies the largest part of the middle Bone of the second Rank of the *Carpus*. It weighs 6 $\frac{3}{4}$.

The 5th is $4 \frac{1}{2}$ Inches long, of the same bigness with the former; and occupies a part both of the middle and of the internal Bone of the second Rank of the *Carpus*; and weighs 4 $\frac{3}{4}$.

The

The sixth is $3 \frac{1}{2}$ Inches long, and $5 \frac{1}{4}$ Inches round its middle; and occupies the external part of the second Bone of the *Carpus*, and weighs $3 \frac{1}{2}$.

Each of the Toes of the ForeFoot consists of two thick short Bones; *The Bones of* whereof the first of the external Toe is $5 \frac{1}{2}$ Inches round, and $1 \frac{3}{4}$ *the Toes of the* Inch long; the second about 1 Inch broad, and $\frac{1}{2}$ Inch long; weigh- *Fore-Foot.* ing $2 \frac{3}{4}$. The first Bone of the second Toe is 2 Inches long, and $6 \frac{1}{2}$ *Tab. 2. G. c.* Inch round; the second is $1 \frac{3}{4}$ Inch from the right to the left, and $\frac{1}{2}$ Inch from above to below; weighing $3 \frac{3}{4}$. The first Bone of the third Toe is 2 Inches long, and $7 \frac{1}{2}$ Inches round: The second Bone is divided into two in this Subject, in figure not unlike an Oxes Hoof, whether it be a *Lusus Naturæ*, or peculiar to all other Animals of this Species I know not. Weigh $4 \frac{3}{4}$. The first Bone of the fourth Toe is $2 \frac{1}{2}$ Inches long, and $5 \frac{1}{2}$ Inches round: The second Bone is in figure not unlike the former, but not divided; from the right to the left 2 Inches, and from above to behind 1 Inch. Weigh $4 \frac{3}{4}$. The first Bone of the fifth Toe is $2 \frac{1}{2}$ Inches long, and $4 \frac{1}{2}$ Inches round: Its second Bone is in figure like the former, but less, and divided. Weigh $3 \frac{3}{4}$. The first Bone of the sixth Toe is 2 Inches long, and $4 \frac{1}{2}$ Inches round; bigger at the upper and becoming narrower at its lower extremity, wherewith a very small Bone is articulated, and weighs $1 \frac{1}{2}$.

All these are besides two *Ossa Sefamoidea*, which were affix'd to the lower part of the lower extremity of each Bone of the *Meta-* *The Ossa Se-* *carpus*; each being about 1 Inch long, $\frac{1}{2}$ half inch broad, Protube- *tamoidea.* rant at the lower part, and concave at their upper or that side whereby they are articulated with the *Metacarpus*; seperated from each other by an *Cartilage*, which did run down in the middle of this lower *Epiphysis* of the Bone in the *Metacarpus*. These *Ossa Sefamoidea* were very useful for supporting the Foot; for about their middle did all the four Hoofes of the Fore Foot terminate. They weigh each $\frac{3}{4}$ lb.

The Hind Extremities consist of the *Ossa Innominata*, the Thigh Bone, the two Bones of the Leg, and the Foot.

The *Ossa Innominata* consisting, as in other Animals, of two large Bones, articulated behind with the *Os Sacrum* on each side, and *The Ossa In-* before with each other *per Synchondrosin*, as 'tis call'd, each may *nominata* be divided, as in Human Subjects, into the *Ilium*, or upper and ex- *Fig. 4. 8.* ternal part, *Os Pubis*, or lower and fore part, and *Ischion*, or lower and back part: Though strictly speaking, these Bones here should only be divided into the *Ilium* and *Pubis*, there being no

The Pelvis.

remarkable part about them which deserves to be pointed out by the Name of *Ischion*. Both these *Ossa Innominata* join'd together, make up the *Pelvis*, which in Circumference is 4 Foot 6 Inches. From the *Os Sacrum* above B. to the upper part of the *Os Pubis* below C. it is 18 Inches, and from the Right D. to the Left E. 17 Inches. The *Os Pubis* at the Articulation is from above C. to below F. 12 Inches; betwixt the two outer and lower Extremities of the *Ilium*, from the Right G. to the Left H. is $3\frac{1}{2}$ Foot; from the *Os Sacrum* above, along the Margin of the *Os Ilium*, down to the fore-mention'd utmost Point is 2 foot $9\frac{1}{2}$ Inches G. H. and from that same Point H. to the *Acetabulum* which receives the *Femur* K. 1 foot. This *Acetabulum* is in Circumference, round the External Edge, 18 Inches. The breadth of the *Os Ilium* from the External Edge H. to the side of the *Pelvis* E. is 13 Inches. Round the Neck of the *Ilium* above the *Acetabulum* M. M. is 14 Inches. The height of the *Ossa Innominata*, from the upper part of the *Ilium* to the *Acetabulum*, 22 Inches. The breadth of the *Os Pubis* from the Articulation with its Partner, to the outside N. N. 8 Inches. The length of the Oval Hole for the *Musculus Marsupialis* O. O. $5\frac{1}{2}$, its breadth 4, its Circumference 12 Inches. Betwixt the lower and utmost Extremities of the *Os Pubis* behind, R. R. 17 Inches. These *Ossa Innominata* are flat before, standing almost perpendicular with the two lower and utmost Extremities of the *Os Ilium* G. H. bending forward, having the *Os Pubis* ascending obliquely, convex before, where join'd together, and concave behind. This ascent of the *Os Pubis* is a further Argument, that this is no Retrocoincident Animal.

Femur.

Tab. 2. L.

The *Femur* is 3 foot long with its upper *Epiphysis* (1.) in circumference 15 Inches; the Neck below it is 13 Inches; the breadth from the great *Trochanter* (2.) on each side 10 Inches; below this *Trochanter* in circumference 18 Inches; about the middle 12 Inches; round above the lower *Epiphysis* 16 Inches; round the lower *Epiphysis* itself (3.) from the *Patella* (4.) on the outside to its opposite part on the inside, $18\frac{1}{2}$ Inches. Its Diameter, where articulated with the *Tibia* behind, is 7 Inches; having two Protuberances, whereof the External is $2\frac{1}{2}$, and the Internal $3\frac{1}{2}$ Inches. The Internal *Epiphysis*, which is received by the *Tibia*, is from before to behind 7 Inches, and the External $5\frac{1}{2}$ Inches. The *Femur* is in general a long streight Bone, having a big round Head (which in this Subject is separated from its

Body

Body by a Cartilage, still an Argument of the Youth of the Animal) receiv'd by the *Ossa Innominata* (1.) A large *Trochanter* on the outside, where the Bone is broadest; from thence in its descent it becomes smaller, flat before and behind, and thicker on the inside than the outside, near to an equal bigness, till it comes to the lower Extremity, where 'tis enlarg'd into two big *Epiphyses*, which are receiv'd by the *Tibia*, with a *Sinus* in the middle about one Inch deep, and as much Diameter. It sends forth a large Protuberance before, which is received by the

Rotula, or *Patella*, a Bone of a very rugous Surface, considerably Protuberant on the outside, being from above to below 8 Inches, and from the Right to the Left 6 Inches. It is articulated with the *Femur per Ginglymum*, having a Cavity on each side which receives, and a Protuberance in the middle receiv'd by the *Femur*.

The *Tibia* is in length, measuring behind, 22 Inches; its circumference at the upper *Epiphysis* 19 Inches, and at the Neck 17 Inches. Before it has a large Depression for facilitating the Motion of the *Patella*; of a very rugous Surface, for Insertion of the *Extensores Tibia*. 'Tis almost Semicircular before, and flat behind: Its circumference about the middle is $9\frac{1}{2}$ Inches, and at the lower Extremity, where it again meets with the *Fibula*, and where it receives the *Astragalus*, 12 Inches.

The *Fibula* is 21 Inches long; $5\frac{1}{2}$ Inches round above, where receiv'd by the *Tibia*; 3 Inches about the middle; and 5 Inches at the lower part, where it receives the *Tibia*. Its *Epiphysis* which forms the External Ankle, or *Maleolus*, measuring from before to behind along its outer Surface, is $5\frac{1}{2}$ Inches.

The Bones of the hind Foot consist of those of the *Tarsus*, *Metatarsus*, and Toes. The *Tarsus* consists of 6 Bones, whereof

The first is call'd *Astragalus* (1.) This is articulated above with the *Tibia*, having a Depression in the middle 3 Inches, which receives, and two Protuberances at the Sides, which are receiv'd by the *Tibia*, $3\frac{1}{2}$ Inches. It receives the *Talus* below with a Surface 4 Inches Diameter. On the inside it sends forth a large Protuberance; and on the outside both it and the *Talus* are received by the External *Maleolus* for the space of 2 Inches. Before, 'tis receiv'd by the *Oss Naviculare* during the space of $4\frac{1}{2}$ Inches. It is in Weight 6 $\frac{3}{4}$.

Talus.
Fig. 7.

The *Talus* (a.) is a very irregular Bone; it is Protuberant behind from the *Astragalus* $4\frac{1}{2}$ Inches. This Protuberance is in circumference at the Extremity 10 Inches, and at its Neck 8 Inches: Below it is very rugous on the inside. It sends forth a Protuberance, which is received by the *Astragalus*, as in Human Subjects. It has three remarkable Surfaces; viz. one upon which the *Astragalus* rests, at its upper side; one at the fore-part, articulated with the *Ossa Cuneiformia*; and the outside, for the *Fibula*. It weighs 1 lb.

Os Naviculare.
Fig. 9.

The *Os Naviculare* is $10\frac{1}{2}$ Inches in Circumference, one Inch thick, concave behind (2.) where it receives the *Astragalus*, and convex before, with its different Surfaces (3.) viz. one whereby it is articulated with the Bone of the Toe on the inside, and one for each of the three *Wedge-like* Bones. It weighs $4\frac{3}{4}$.

Ossa Cuneiformia.

The Bones of the second Rank of the *Tarsus* are call'd the Three *Wedge-like* Bones, two of which are articulated at the back-part with the *Os Naviculare*, as is said, and the third partly with the *Talus*, and partly with the *Os Naviculare*; each of them is about 1 Inch thick: That on the inner Side (4.) is the least, being from the Right to the Left one Inch thick, in Weight $3\frac{1}{2}$ lb: The middle 2 Inches (5.) in weight $3\frac{1}{2}$ lb; and that on the outside (6.) $3\frac{1}{2}$ Inches, in weight $3\frac{1}{2}$ lb. This last has two Surfaces at the fore-part, whereby 'tis articulated with the two utmost Bones of the *Metatarsus*. The middle Bone of the *Tarsus* being only receiv'd by the middle Bone of the *Metatarsus*.

The Bones of the Metatarsus.

The External Bone of the *Metatarsus* is very irregular: It is articulated behind with the External *Os Cuneiforme*, where 'tis about 2 Inches from above to below; from whence (its External Surface being very rugous) it becomes gradually smaller; being somewhat Concave below, and Protuberant above, till it terminates in a round Extremity. In Weight $3\frac{1}{2}$ lb.

The second is a short thick Bone, 8 Inches in Circumference, and $2\frac{1}{2}$ Inches long; in weight $3\frac{1}{2}$ lb. This receives the first Bone of the Toe, which is $4\frac{1}{2}$ Inches in Circumference, and 2 long; and receives the second Bone of the same Toe, being 3 in Circumference, and $1\frac{1}{2}$ long; greater at its upper, and smaller at its lower Extremity, to which is affix'd a small Bone. These Weigh $3\frac{1}{2}$ lb.

The middle Bone of the *Metatarsus* is the largest of all those belonging to the Toe, being 7 Inches round, and 3 long; $3\frac{1}{2}$ lb in Weight. It receives the first Bone of the Toe, which is $4\frac{1}{2}$ Inches round, and $2\frac{1}{2}$ long; to which also is join'd another small Bone to make up the Extremity: In Weight both $3\frac{1}{2}$ lb.

The

The two Bones of the *Metatarsus* remaining are thin, broad, and irregular; the first whereof is $2\frac{1}{2}$ Inches broad, and $2\frac{1}{2}$ long; weighing each $\frac{3}{4}$ lb. to which also adheres a small Bone, as in the former Toe, but less. The second and last of the *Metatarsus* on the inside is two Inches broad, and as much long, thin like the former, having a small Protuberance adjoin'd instead of a Toe. The Bones of the 4th Toe weigh $\frac{3}{4}$ lb, and the 5th $\frac{3}{4}$ lb.

I once designed to have compar'd more particularly the Bones now describ'd, with those of *Tentzelius* and Dr. *Moulins*: But since both these Treatises have been already communicated to the R. S. and I doubt not are in the Hands of most of the Honourable Members thereof; and since I have already insisted longer upon these, than I suppose you expected, I shall only put you in mind in few Words, that *Tentzelius* tells his Friend, that in digging in a Hill near *Erfurt* in *Germany* for a fine white Sand, there were found several huge Bones, first mistaken for a Giants; but upon tryal, and the perusal of Dr. *Moulins's* Treatises, known to be the Bones of an *Elephant*: And that among the rest there were found the Head 42 Inches Diameter; two Tusks $2\frac{1}{2}$ Spans large, and 8 foot long; four Grinders, each 12 lb. the *Humerus* 4 foot $2\frac{1}{2}$ Spans; the *Vertebra* of the Neck, each 4 Spans in Circumference, and 2 Spans high; the *Ossa innominata* $2\frac{1}{2}$ foot long; with the Head of the *Femur* inserted in the *Acetabulum*, and part of the *Tibia* 22 Inches at the biggest, and 17 at the smallest part: That they were obliged to dig 24 foot deep, before they could get out the Head; that the Bones lay in such a Posture, as betoken its being over-whelm'd, or having had great Strugglings while a dying; viz. the Left fore Foot stretch'd forward to the side of the Head, which lay toward the North, the Right inclining backward under the Body; the Left hind Foot drawn in toward the Body, and the Right distorted here and there, out of its Natural Posture. From all which he concludes this to have been the largest *Elephant* that ever was seen in *Europe*; and that it could be brought hither by no other means than the Flood, both from the Preternatural posture of the Body, and from the different *Strata* of Earth lying above it, without the least sign of having been digg'd to bury it.

The Vertebrae of the Back.						The Ribs.							
No.	lb.	3.	3.	Inch.	Breadth of Extrem.	No.	lb.	3.	3.	Weight.	L. of inner Surface.	L. between Extrem.	Breadth of Extrem.
					Inch.					Feet. Inch.	Feet. Inch.	Feet. Inch.	Inch.
1	2	4		8	2	1	13	1	5	1	4		4
2	2	2		12	3 $\frac{1}{2}$		12	4	9		8		3
3	2			13	4 $\frac{1}{2}$	1	1	2	11 $\frac{1}{2}$		10		
4	1	5						5		2	2		
5	1	4	2	12	3 $\frac{1}{2}$		8	4	6				2 $\frac{1}{2}$
6	1	2	3	11 $\frac{1}{2}$	3		2	3					3 $\frac{1}{2}$
7		15	6	11			1	5	8				2 $\frac{1}{2}$
8		14		10 $\frac{1}{2}$	2 $\frac{1}{2}$		4	6	10				
9		14		10			3						4 $\frac{1}{2}$
10							15						5
11							14	4	7				3
12	13			9 $\frac{1}{2}$	2		13	4	5				
13				9			12		4				1
14					1 $\frac{1}{2}$		10	6	4	1 $\frac{1}{2}$	1	11 $\frac{1}{2}$	
15				6 $\frac{1}{2}$	1 $\frac{1}{2}$		9					10	
16				6	2		5	5	1	9		8	
17				5			5			8		7	
18		2		4 $\frac{1}{2}$			3	2		5		4 $\frac{1}{2}$	
19		4		3			2	1					
20	8	7				16	15	6					

1	13	4	3	Weight of Ribs	33	15	4	
2	12	7		Tail	4	2	7	3
3	11							
	2	5	3					

The

The Skeleton of the Elephant consists of the Bones of

The Head divided into those of the

Upper Jaw, viz.

lb 3 3 3

{	Calvaria, or upper and back part	1			
{	Frons, or upper and fore part	1			
{	Two Maxillary Bones	2			
{	Two Bones of the Palate	2			
{	Two Zygomatic Bones	2			
{	Two Styloid Processes	2			
{	Two Tusks	2			
{	Four Grinders	4	66		
{	Lower Jaw	1			
{	Four Grinders	4	45		
		21	111		

The Trunk composed of the

Spine consisting of the Vertebra of the

{	Neck	7	7	10	5
{	Back	19	20	8	7
{	Loyns	3	2	5	3
{	Os Sacrum	5	4	0	0
{	Tail	29	4	2	7
{	Ribs, 19 Pairs	38	33	15	4
{	Sternum	4	3	00	0
		105	75	11	3

The Fore Extremities

{	Scapula	2	19	08	0	0
{	Humerus	2	16			
{	Cubitus and Radius	4	15			
{	Carpus, Six on each Foot	12	3	12		
{	Metacarpus	12	3	4		
{	Toes	24	2	3		
{	Os Sefamoidea	24		6		
		80	60	1		

The Hind Extremities

{	Os Innominata, viz.					
{	Ilion					
{	Pubis					
{	Femur, or Thigh Bone	2	28	00		
{	Tibia and Fibula, or Leg and Spit Bone	2	16			
{	Patella, or Knee Pan,	4	13	4		
{	Tarsus	2		12		
{	Metatarsus	12	5	10		
{	Toes.	12	1	06		
		20	1	02	$\frac{1}{2}$	

Summa Totalis

54	66	2	$\frac{1}{2}$
260	312	14	7
			1

This is the Total Sum of the weight of the Bones.

The Method of mounting the Skeleton. I come now to the last thing I propos'd, which is the Method I us'd in mounting the Skeleton; and because Dr. *Moulins's* way of nailing a Plate of Iron to the Roof of the Mouth, in which the Iron Rod that run through the *Vertebrae* of the Neck was fastned, would have been inconvenient, by spoiling the back-part of the Scull, obstructing its View, and making the Head look too much forward, which was the fault of his Skeleton, as represented by the Figure, I contriv'd another, which is as follows.

Connexion of Bed. There was an Iron Rod made about the bigness of one for a Bed, as long as the *Elephant*, from the Forehead to the Point of the Tail, being 14 Foot, which pass'd in at the fore-part of the Scull above the Hole for the Root of the Trunk, and run back amidst the fore *Cellules*, passing along the lower part of the Seat of the Brain, and going out at the lower part of the Hole for the Spinal Marrow; and lest the inconveniency of its Weight (as Dr. *Moulins* fear'd) should happen to break the tender *Lamine*, there was another Rod of the same bigness, which pass'd in at the one side of the Head, where the Depression is for Insertion of the Muscles of the Lower Jaw and *Proboscis*, and run through the *Cellules* at the side, going transversely along the lower part of the Seat of the Brain below the former, and passing out at the other side; by which this Rod, from the Right to the Left, eases the Burthen of the other, in supporting the Head on both sides, as well as the other did before. And lest any of these should slide out, I caus'd to be screw'd a Piece of Iron upon each Extremity of that which pass'd from the Right to the Left, and upon the fore end of that which did run from before to behind. Afterwards the second *Vertebra* in the middle of its Tooth, and all the other following *Vertebrae* were perforated in the Center of their Bodies; and to make the Head still more steady, the Base of the Scull was twice perforated on each side of the Hole for the Spinal Marrow; and a strong Wire being pass'd through these Holes, it run from the Right to the Left above the Rod, and kept it firm, lest it should have bended, and suffer'd the Head to incline too much downward by its Weight.

Connexion of the lower Jaw. The joining of the Lower Jaw, which is perhaps the most ponderous Bone in any Land Animal, was next to be consider'd; therefore two Wires were pass'd in at about one Inch distant from each other, running from above to below, to that part of the

the Base of the Scull (y) which is for Reception of the *Condyles*; *Tab. 3. Fig. 3.* and the same two Wires having pass'd through two Holes, made from before to behind in the *Condyles* themselves, both Extremities of the Wires were made to meet together at the upper and outer part of the *Condyles*, and so twisted and made firm. Being still suspicious that this would not be sufficient to support such a vast Weight, and fearing lest either the Base of the Scull or the *Condyles* might come to suffer, there was a Wire brought round the Margin of the so often mention'd great Hole in the *Os Maxilla Superioris*, which being folded, was twisted several times toward the *Processus Corona* in the lower Jaw (b.) where there were two Latchets, or Foldings of Wire plac'd in the inner side; the folded Wire from the *Os Maxilla* was brought in betwixt them, and a Pin pass'd through all three, to be taken out at pleasure. And lest these should not still be sufficient to support its Weight, there was provided in the third place a folded Wire from behind to before in the *Symphysis Menti* (b.) which passing in betwixt the two *Ossa Palati* (b.) a Pin was put across them, to be taken out at pleasure; which is such a Relief to the *Condyles*, that without making use of the Wires running from the *Os Maxilla* to the *Processus Corona*, we found it sufficient to support the Weight of the Jaw; and 'tis so much the more convenient, that by pulling out this Pin, the lower Jaw can be brought back and forward, to shew the Spectators its considerable Weight. *Fig. 9. Fig. 1.*

Being obliged to saw the Scull, in order to take out the Brains, for fastning the upper part of it, there were two Wires plac'd at the back-part of that which is below the Division; into which are linked two other Wires, which reach to that part above the Division, and are there receiv'd into two foldings of Wire plac'd there on purpose. The same Contrivance is also observ'd before; so that this upper part may either be laid back, to shew the Structure and Contrivance of the *Cellules*, or taken altogether off, as seems good. *Connexion of the upper part of the Scull.*

The *Vertebra* being all perforated, my next Care was to have the Ribs match'd and join'd; in order to which, having first suited them in Pairs, and fitted each Pair for its *Vertebra*, I caus'd to be perforated each of their *Epiphyses* twice from above to below, (once toward the fore, and once toward the back part) and the transverse *Processes* of the proper *Vertebra* opposite to the Holes of the Ribs, after the same manner; and then perforated the Ribs at the Extremity toward the *Vertebra*, and the *Sinus* of the *Vertebra*. *The Joining of the Vertebrae and Ribs.*

Vertebra (corresponding to the Rib) in toward its Body: After which a Wire two Inches long was fastned in the Body of the *Vertebra*, and Extremity of the Rib, and then both were brought together; which being done, the Wires were put into their respective Holes in the transverse *Processes* and Ribs, and both the ends of each of the two last Wires, being brought together at the upper part and Interstice betwixt the Ribs and transverse *Processes*, were twisted and made firm. Thus I continued to do throughout all the Nineteen Pairs.

Leather, in-
stead of Car-
tilages.

After this I provided some Jumps, or Leather, such as Shoemakers use for the Heels of Shoes, because the Bend or Sole Leather us'd in mounting the Sceletons of other Animals, could not be so conveniently fitted as to its thickness. Having wetted and beat this Leather, it was shapen'd according to the bigness of each *Vertebra*, perforated in the middle, and put upon the Rod alternatively, first the *Vertebra*, and then the Leather, to supply the defect of the Cartilages, which were all lost in boiling, as usually happens, and was beat so close, that the oblique *Processes* of the *Vertebra* might meet. This was continued till all the *Vertebra* were upon the Rod, all along to the *Os Sacrum*; and because the first *Vertebra* is nothing concern'd with the Rod, 'twas convenient to pass a Wire betwixt the Scull and it on each side, that it might not remain loose, but be fix'd to the *Condyles*, by twisting and making fast the Wire.

Connexion
of the *Ossa*
Innominata.

I came next to the *Ossa innominata*, which had been disjoin'd in Boiling, both before or below at the *Os Pubis*, and above or behind at the *Os Sacrum*. I made two Rods of Iron to pass transversely from the one side (the one above, and the other below) through the *Os Sacrum* to the other. These were riveted on the back side at both ends; and then having perforated the *Os Sacrum* from above to below through the middle of its Body, it was also put upon the Rod for the Spine, which was a very difficult Task, because the Rod being thick was uneasy to bend, and the Situation of the *Os Sacrum* requir'd it to be bended precisely, betwixt the last of the *Vertebra Lumborum*, and the *Os Sacrum*. Neither was it easy to perforate the *Os Sacrum* itself, being obliged to make a Drill on purpose, there being no other Bone in the Body that requir'd one so long. After this I proceeded to put on the Bones of the Tail, and their Sham Cartilages alternatively, as they followed in order, till all the Rod was fill'd,

on whose Extremity another Piece of Iron was screw'd, to keep all firm and secure.

Afterwards a large Wire was passed from the fore to the hind part of the *Sternum*, whereby all its Bones were fix'd to one another; and to them were joined pieces of Bend Leather to support the Cartilages, which had been first mangled by the Butchers, and then lost in the boiling. These I fitted to the Articulation of each Rib, whereto they were join'd; and perforating the Extremities of the Ribs twice, I pass'd two Wires betwixt the Sham Cartilages and them, bringing the two ends together, twisting and fastening them on the inside, by which all the *Thorax* was mounted. And lest the Ribs thus fix'd at both Extremities should be too ready to move from before to behind, and *à contra*, each of the Ribs was perforated above toward the Back, and below toward the Belly, for receiving of Foldings and Latchets of Wires to be fastned in them. Then I provided two big Wires, each being folded twice, the length of the *Thorax*; one of which being pass'd through the last Rib, its two Parts being brought together, they were twisted several times, till it was brought opposite to the Latchet in the next Rib, within which the one part was pass'd, the other continuing without, and then twisting again, till it came to the third; it was so continued throughout all the Ribs, both above and below, to keep them firm and at a due distance. And thus you have the whole Trunk mounted.

Next, I took the two *Scapula*, as belonging to the upper Extremities; and lest they should be too weighty for the Ribs, if nail'd to them, as is usually done in other Sceletons, I thought fit to perforate both of them opposite to one another at their upper Margin, and to pass a good big Wire through one of the Perforations, which being folded, was twisted for the space of 20 Inches, *i. e.* from the *Scapula* on the one side, streight over the Back, passing in betwixt two of the *Vertebra*, till it came to that on the other, where it was fastned. Afterward both the *Scapula* were fastned, by bringing two folded Wires from the outside of each *Scapula*, through the first and third Rib, in whose inside they were fix'd; then was the Head of the *Scapula* perforated through the Margin which guards the *Humerus* at the fore and back-part.

Connexion
of the Hu-
merus.

The Head of the *Humerus* opposite to the middle of the Concave part in the *Epiphysis* of the *Scapula*, was four times perforated, twice toward the inside, and twice toward the outside; whereinto were put two folded Wires, whose Extremities were fix'd below at the foresaid inner and outer part, and into whose Foldings a large Pin pass'd from the Margin of the *Scapula* on the one side, to that on the other, (to be pull'd out at pleasure, for suspending of the *Humerus*).

Cubitus
and Radius.

The *Cubitus* and *Radius* were join'd with the *Humerus*, thus: The *Cubitus* was perforated twice in the back part, at the beginning of the *Olecranon* on each side; where two Extremities of Wires being fix'd and riveted, they were brought through the upper part of the said *Olecranon*, and then twisted, till they came to the *Humerus*, which was perforated from the back-part, where the Depression for receiving the *Olecranon* is, to the fore part above the *Epiphysis* received by the *Cubitus* and *Radius*; through which Holes made pretty large, the Wires thus twisted were pass'd, the one to the *Radius* on the outside, and the other to the *Radius* on the inside; where they were introduc'd, and brought out at the back-part of the *Cubitus* below the *Olecranon* on each side, where their Extremities were riveted $2\frac{1}{2}$ Inches below their Insertion: By which means the Flexion and Extension can be easily shewn, because the Wires have sufficient space to move in their Passage through the *Humerus*, these Holes being made bigger on purpose, as is said. The lower *Epiphysis* of both *Cubitus* and *Radius* having been separated by boiling, as I have formerly observ'd, I was forc'd to perforate each of them below toward the *Carpus*, and pass a Wire obliquely upward, whereby to secure them: And because the *Radius* is distinct from the *Cubitus* below, there was a Wire passed from the one to the other, and riveted at each outside.

The Fore
Foot.

In joining the Bones of the Foot, I took special care to hide the Wires, so that none might appear to the Beholders. For doing whereof the *Cubitus* was twice perforated in the back part of the *Epiphysis*, about 1 Inch above the Articulation with the Bone of the *Carpus* on the outside, and the *Radius* in the inside and back-part, after the same manner: Both which Perforations were continued through the two Bones of the first Rank of the *Carpus*. Afterwards the External Bone was perforated a third time; all which run from above to below, to the first, second, and third Bone of the second Rank. Which being done, two folded

folded Wires were pass'd in at the four Holes of the back part of the *Cubitus* and *Radius*, where their Duplicatures were formed ; and the fifth Wire put into the Hole made in the middle of the External Bone of the first Rank of the *Carpus*, was continued with the rest through the Bones of the second Rank to those of the *Metacarpus*, where they run from one Extremity to another ; that is to say, the outer part of the folded Wire from the *Cubitus*, did run down the outside of the External Bones of the first and second Rank of the *Carpus*, to the External Bone of the *Metacarpus*, all along, till it was brought out at the Extremity of the furthest Bone of the Toe belonging thereto ; and the inner part of the same Wire passing from the *Cubitus* through the same two Bones of the *Carpus*, ran down to the third Bone of the *Metacarpus* from the outside, from whence 'twas convey'd to the Extremity of its Toe, and there riveted. The third Wire pass'd from its entry in the middle of the External Bone of the first rank of the *Carpus*, to that of the second, and from thence down to the second Bone of the *Metacarpus*, from the outside, to the Extremity of its Toe, where it was fastned ; and the folded Wire from the back-part of the *Radius* pass'd down at two Places through the middle Bone of the first rank of the *Carpus*, to that of the second rank, and from thence to the fourth and fifth Bones of the *Metacarpus* from the outside, and still forward to the Extremities of their Toes, where they were fix'd. This done, I caus'd to be perforated the External Bones of the *Carpus* twice, *i. e.* toward their fore and back part, as also the *Metacarpus* at the upper and lower Extremity ; passing the Drills from the outside to the inner of each Bone, or from the Right to the Left, by which the Bones above were as well join'd with their Sides, as with those below them ; so that each was kept secure in its Place, especially the Bones of the *Metacarpus*, which would have too readily separated from each other, and endanger'd the breaking the Wires, by which they were join'd with those above. Since the third Bone of the first rank of the *Carpus* lies, as it were, at the side of both Ranks, therefore I thought it convenient to pass the two Extremities of the Wire, which run from the right to the left, in the first Rank, that so it might be fastned with its Partner on the inside ; and since the Internal Bone of the *Metacarpus* yet remain'd to be join'd, this inner Bone of the *Carpus* was again perforated, and a Wire brought from it to the inner Bone of the second Rank, and from

thence to the said Bone of the *Metacarpus* with its Toe, where it was fastned.

Connexion of the Femur. The upper *Epiphysis* of the *Femur* having also separated by boiling, it was requisite to perforate its Head four times, for the immission of two folded Wires, which were brought obliquely down the inner and outer side to its Neck, where their Extremities were twisted and secured. Afterward it was perforated in the middle four times more, for two other folded Wires, which were once or twice twisted, and their Extremities put through the foresaid Holes to the inner and outer part of the Neck of the *Femur*, as before, there to be made fast. The *Acetabulum* was perforated in the bottom, and these two Foldings pass'd through it; whereinto was put a Pin, at the back-part of the *Ossa innominata*, to be pull'd out at pleasure, and the Thigh suspended as the *Humerus*.

Of the Tibia and Fibula. Two folded and twisted Wires were pass'd in at the *Epiphysis*, on each side of the *Spina*, in the middle of the *Tibia*, and their Extremities brought out at its upper and back-part, where they were riveted: Afterward the lower *Epiphysis* at the *Femur* was perforated from the right to the left, and a Pin-pass'd from the out-side, through the Foldings of the Wires from the *Tibia*, to the in-side, (whereby the Flexion and Extension is most conveniently shewn,) to be taken out at pleasure. The *Perone* was fix'd to the *Tibia* at the upper part, by a Pin passing obliquely upward from the one to the other; and the *Patella* fastned to the fore-part of the *Femur*, by a Pin passing directly inward from before to behind.

Of the Hind Foot. The lower part of the *Perone* forming the External *Malleolus*, is perforated from without to within, as is the opposite part of the *Tibia* forming the Internal one; likewise the *Astragalus* is perforated from the right to the left, corresponding to these two Holes, for the immission of a Pin, whereby the Foot is join'd to the *Tibia*, to be pull'd out at pleasure. The *Astragalus* is join'd to the *Talus* by a Pin, pass'd from the upper and middle part of the one, to the lower part of the other, where it is riveted. The *Astragalus* is thrice perforated before; into two of which Holes a folded Wire is pass'd, which goes forward through the *Os Naviculare* to the Bones of the *Metacarpus* of the second and third Toe from the inside; at whose Extremities they are fix'd. The third Wire runs from the *Astragalus* to the *Os Naviculare*, and the third *Os Cuneiforme*, to the fourth Toe. The said *Os Naviculare*

is perforated on the inside for a Wire, which runs through the Bone of the *Metacarpus* and inner Toe. The third *Os Cuneiforme* is perforated for a Wire which passes through the Bone of the *Metacarpus* and outer Toe. The three *Ossa Cuneiformia* are join'd to each other by a folded Wire, which runs twice from their outside to the inside, where they are secured.

Sir, By the Opportunity I have had of preparing and joining these Bones, it may be expected I should give some Account of their Structure: But as the design of preserving the Skeleton entire gave me no Liberty to go any further than their External Surface, so it cannot be expected I could dive any deeper in the Knowledge of them. *Tentzelius* says, *Omnia isthac Ossa porosa sunt & rimosa*; and I may add, *Levia* too: For there is nothing about them to be seen of that Solidity and Compactness, that smoothness of Surface, and Whiteness, which is observable in other Quadrupeds of the larger size, such as Oxen, Horses, Harts, &c. or smaller, as Sheep, Dogs, Cats, &c. And I should have readily attributed this to the Youth of the Animal, had not *Tentzelius* from his Subject, suppos'd to be 200 Years Old, told the same. And this differs much from the Account of the *Behemoth* in *Job*, whose Bones are said to be as strong pieces of Brass, and Bars of Iron. The *Lamina* of the Head were thin and solid; the External Table thin and more ponderous; the Teeth exceeding solid and ponderous: So that from the computation of the Weight of the upper part, which was taken off by the Saw, as in *Tab. 3. Fig. 5.* and 6. which is only 6 lb. weight, I may reckon all the Head, which weighs 66 lb. beside the Teeth, not to weigh above 24 lb. at most; which well agrees with what *Tentzelius* says, that each of the *Dentes Molares* were 12 lb. weight, and that of all the 45 lb. which the Lower Jaw weighs, the rest of the Bone beside the Grinders do not exceed 12 or 16 lb. For its External Surface seems to be both porous and rimous, as is said; and at perforating the *Condyles* seem'd to be very spongy, as were the *Ribs, Femur, Tibia, &c.* where, after the Drill had pass'd the External *Lamina*, which was very thin, it would have run forward as if it had been through so much Moss. When the *Epiphysis* came off the Thigh Bone, it resembled very much the *Epiphysis* of the *Femur* in Man; its minute *Cellules* were not so big as those of an Oxe, and the *Lamina* which circumscrib'd them, not by much so solid. The *Humerus* indeed both above and below was

much harder ; it did heat the Drill in passing : And there may be some reason for that too ; *viz.* that since the Progression of most Quadrupeds chiefly depends upon a more frequent motion of the Fore than Hind Limbs, it does much more here, where the Head is proportionably more heavy than in other Animals. And this perhaps is the reason too, why the Fore Limbs in this Animal are brought so far forward ; for measuring in a streight Line from the *Humerus* above to the *Carpus* below, and bringing another Line directly backward at the Articulation betwixt the *Humerus* and *Cubitus*, from the perpendicular Line before to the point of the *Olecranon* behind, it is 20 Inches ; which is the reason why some believe my Engraver has made the fore Limbs of the Sceleton to bend too much at the Articulation. The Bones of the *Carpus* are pretty solid, and by Perforation they seem only to have a little spongiosity about the middle : All the rest of the Bones of the fore Foot are spongy. The *Astragalus*, *Os Naviculare*, and *Ossa Cuneiformia*, are more solid ; but the *Talus* and other Bones of the hind Foot spongy. The Spine was spongy, as is usual ; the *Ossa Innominata* of a middle Consistence ; and the *Scapula* very thin, but solid toward its Neck. I cannot positively determine the Cavities for the Marrow, nor quantity of it ; but by comparing the Dimensions with the Weight and small quantity of Fat to be seen at the boiling, we may suppose it not to have been much in this Animal : I know not how it may be in others of this Species.

I must not forget to tell you, that when I weighed the Bones, it was immediately before they were joined ; so that their weight was much diminish'd, in respect of what it was when they were newly boil'd. The weight is $\frac{3}{4}$ 16. to 1 lb. and the measure, according to the *English* Yard, 12 Inches to a Foot, and 12 Lines to an Inch.

And thus, *Sir*, I have finish'd these my Weak Endeavours : The Undertaking, I doubt, will seem bold to some, and rash to others, and the Performance mean. But the many Obligations you have laid upon me, and the frequent Marks of Esteem I have received in your several Letters, made me pass over all Obstacles, Reflections, and Discouragements, when to serve you and your Honourable Society was my only Design. I have rather chosen to address you in a plain and common Stile, than give the least suspicion of Disingenuity in a finer Language ; especially since

since it is History I have written, where Matter of Fact, and not Romance, where Eloquence, is the chief Design:

The Copper Plates, which at my own Charges I have caused to be engraven here, I acknowledge might have been done finer in *London*; but since I had the Original by me, whereby I was able from time to time to correct in the Ingraving what Errors happen'd in drawing the Figures, I rather chose to have them done by me here: And tho' the Draughts of the Engraver be coarse, yet I have endeavour'd what in me lay to have the Figures true and well proportion'd. Wishing all Health and Happiness to your self, Prosperity and Success to your Honourable and Famous Society. I continue,

Sir,

Your most humble, and

From my House at
Dundee, April 27.
1709.

most obliged Servant,

PATRICK BLAIR.

The

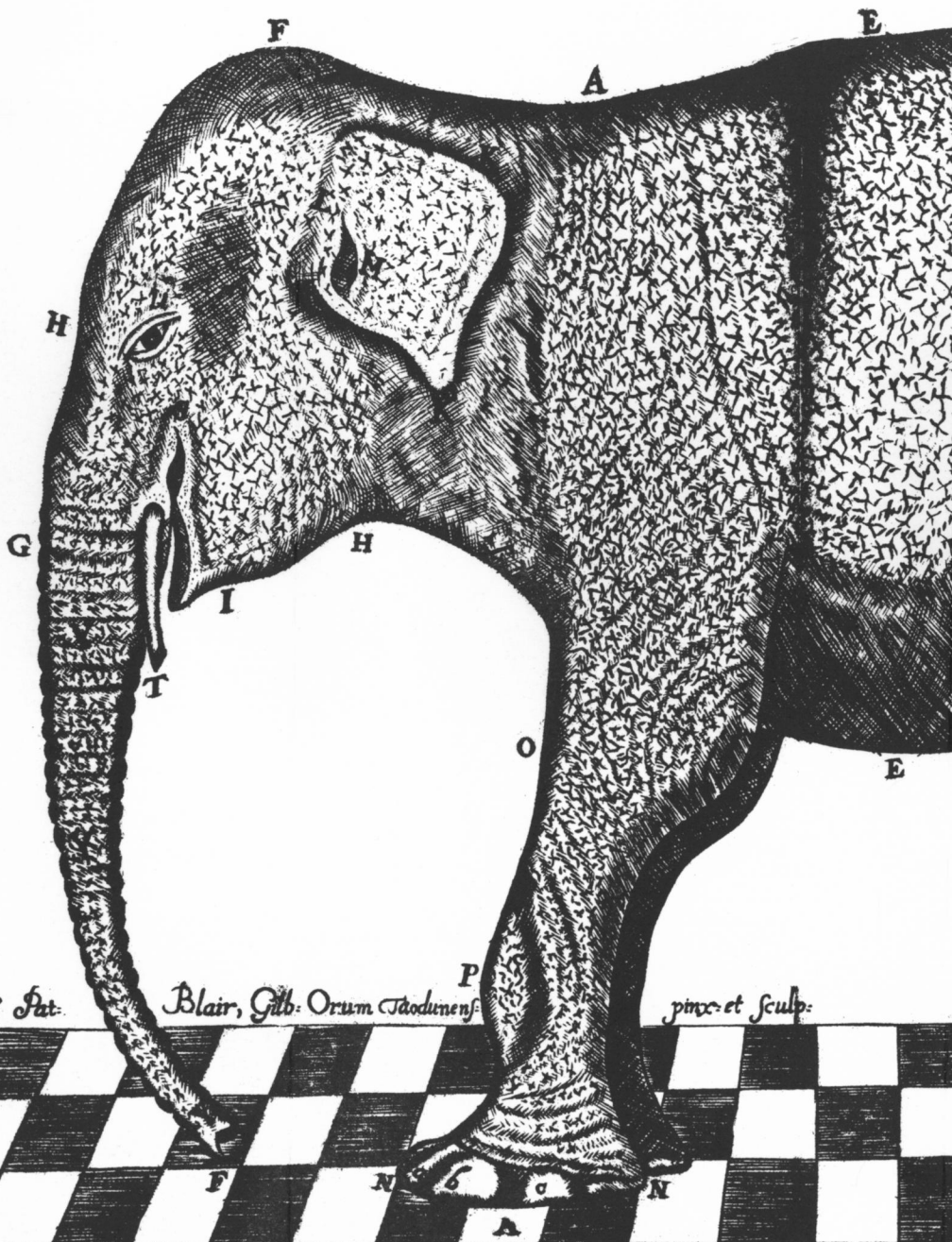
The Explication of the Tables.

T A B U L A I.

Represents the staff'd Skin of the Elephant, as it now stands in our Hall, with an Account of its particular Dimensions.

	Feet, Inches.	
A. A. The Height of the <i>Elephant</i> at the Fore Feet.	8	6
B. B. Its Height at the Hind Feet.	9	
C. C. Its Length.	10	
C. D. The Length of the Tail.	4	3
E. E. The Circumference of the Belly.	14	
F. F. From the top of the Head to the Point of the <i>Proboscis</i> .	8	
G. F. The length of the <i>Proboscis</i> .	4	6
H. H. The distance between the Forehead and lower Jaw.	2	3
F. I. From the top of the Head to the lower Jaw.	4	6
K. K. The length of the Ear.	1	7
L. L. Its breadth.	1	5
M. The Orifice of the <i>Meatus Auditorius</i> .		
N. N. The Circumference of the fore Foot round the Hoofs.	3	10 $\frac{1}{2}$
a. The Fore Hoof fore-shortned.		5
b. The middle External Hoof.		5
c. The third External Hoof.		4 $\frac{1}{2}$
<i>Note</i> , That neither the Diameter of the fore Foot from before to behind, which was———		
	1	4 $\frac{1}{2}$
nor from the right to the left, which was———		
	1	2
can be so here.		
O. O. The Circumference of the fore Foot at the upper Joint.	4	3
P. P. At the Articulation with the <i>Carpus</i> .	2	6 $\frac{1}{2}$
Q. Q. The Circumference of the hind Foot round the Hoof.	3	4
The Diameter from before to behind.		
From the right to the left.		
a. The breadth of the fore Hoof.		3
b. The breadth of the outer Hoof.		4
c. The breadth of the third Hoof.		4
R. R. The Circumference of the hind Leg.	2	2
		S.

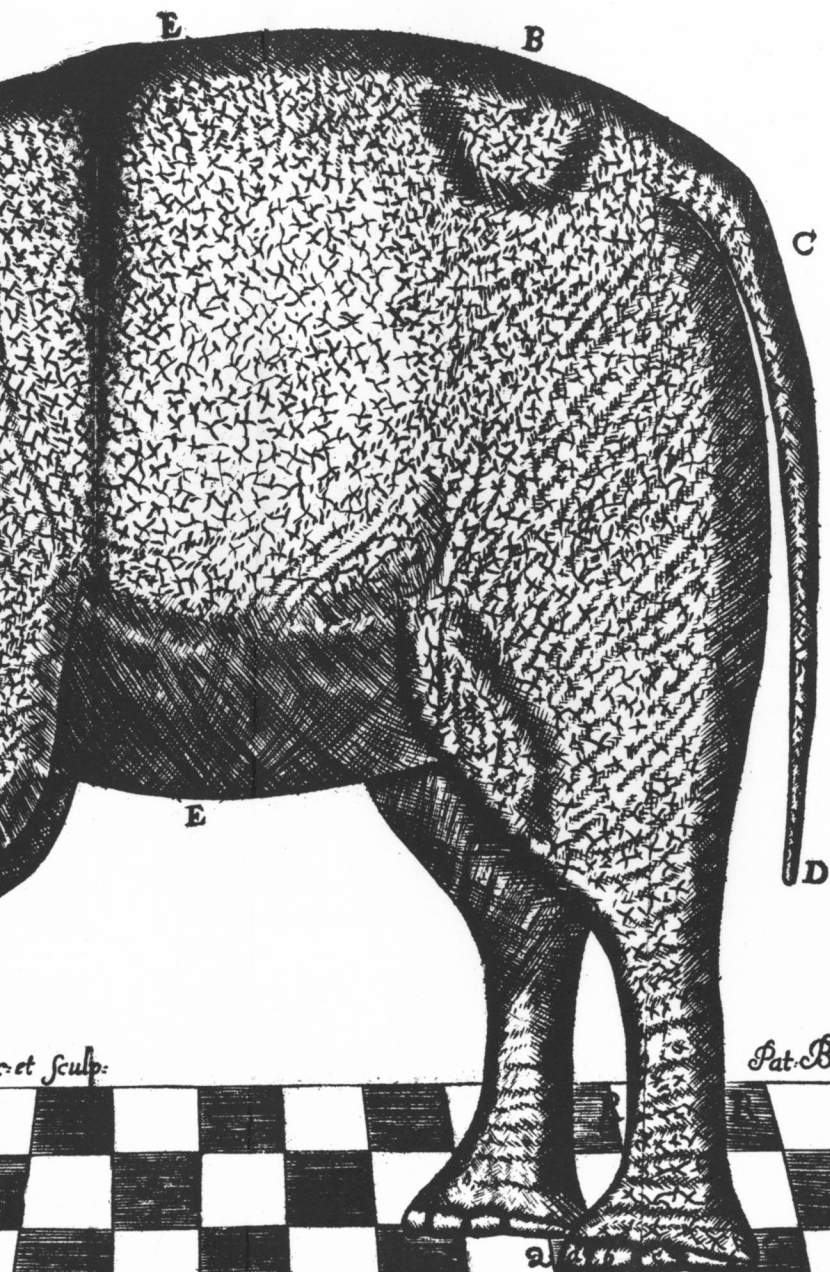
Tab 1



Cura et Impens. Pat.

Blair, Glib. Orum Tædinef.

pinc. et sculp.



et sculp.

Pat. Blair Taodumens: Excudit

Z

S. The Mouth.

T. The Tusks broken off by the middle.

U. The Eye.

X. Represents the Scabs about the Belly.

Y. Y. The Depressions in the Skin through the folding of the *Proboscis*.

a. A Protuberance first occasion'd by the *Ossa Imominata*,

when the Animal was alive and very lean, and still remaining in the Skin.

b. A Protuberance in the fore-part of the Thigh.

c. The lower Joint of the fore Foot, where there is a Depression in the Skin.

d. d. Several Wrinkles in the stuff'd Skin.

T A B U L A II.

Represents the Sceleton of the Elephant, as it was mounted by my Direction, and now stands in the Repository of Rarities in Dundee.

A. The Skull taken in Profile, whereby a part of the fore side is foreshortned.

a. The Hole for the Root of the Trunk foreshortned.

b. b. The two *Ossa Palati*.

c. c. The Two Tusks as they proceed from the *Ossa Palati*.

d. d. The broken off Extremities of the Tusks.

e. The Grinders of the Upper Jaw.

f. The fore Grinder of the Lower Jaw.

g. The undulating Lines of the lower Surface of the Grinders of the Upper Jaw.

h. The inner Grinder of the Lower Jaw.

i. Part of the *Ossa Mala*.

k. Its Articulation with the *Ossa Zygomaticum*.

l. The *Ossa Zygomaticum*.

m. The Orbit of the Eye.

n. Its upper Protuberance.

o. Its middle Protuberance where the *Trochlea* is inserted.

p. Its lower Protuberance.

q. A *Sinus* at the bottom of the Orbit.

r. r. A Depression fit for lodging the Muscles of the lower Jaw and *Proboscis*.

s. The Orifice of the *Meatus Auditorius*.

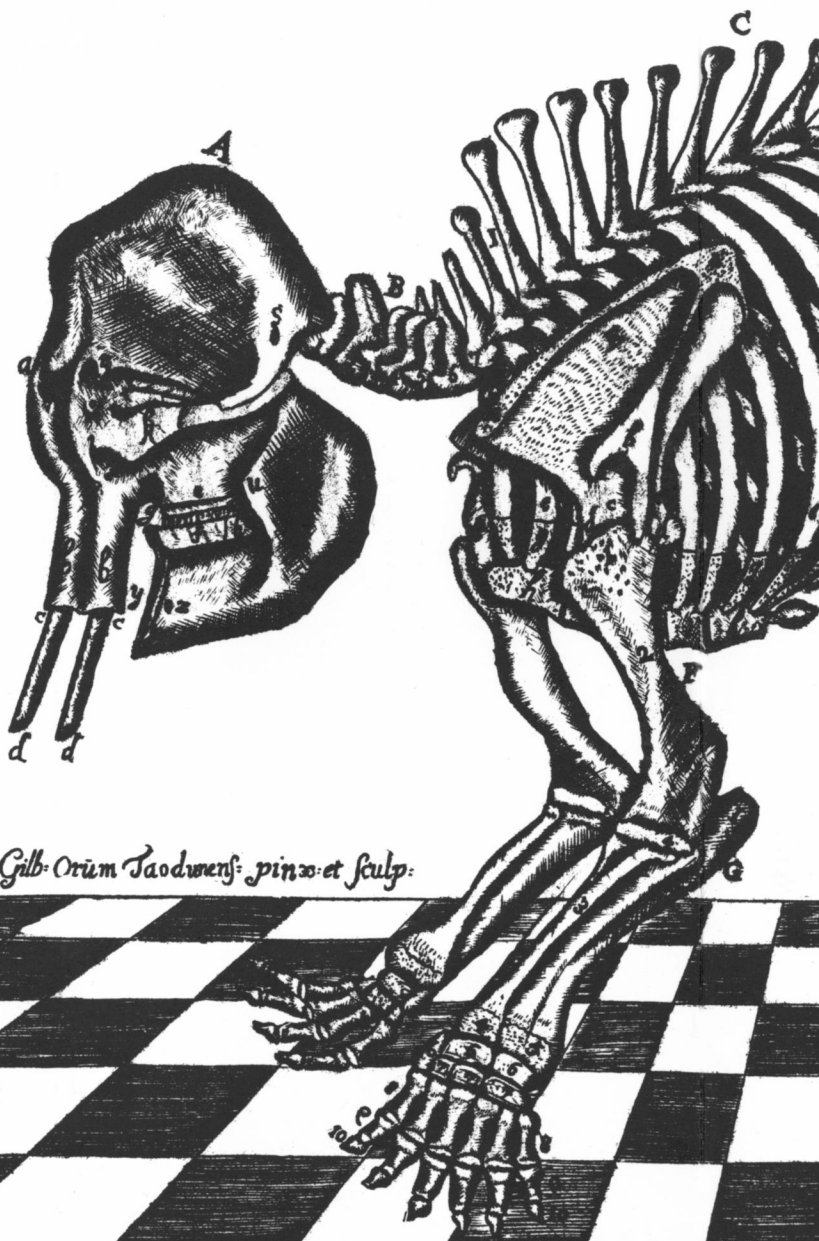
t. t. The Articulation of the *Ossa Calvariae* with the *Ossa Zygomaticum*.

u. The *Processus Coronae* of the lower Jaw.

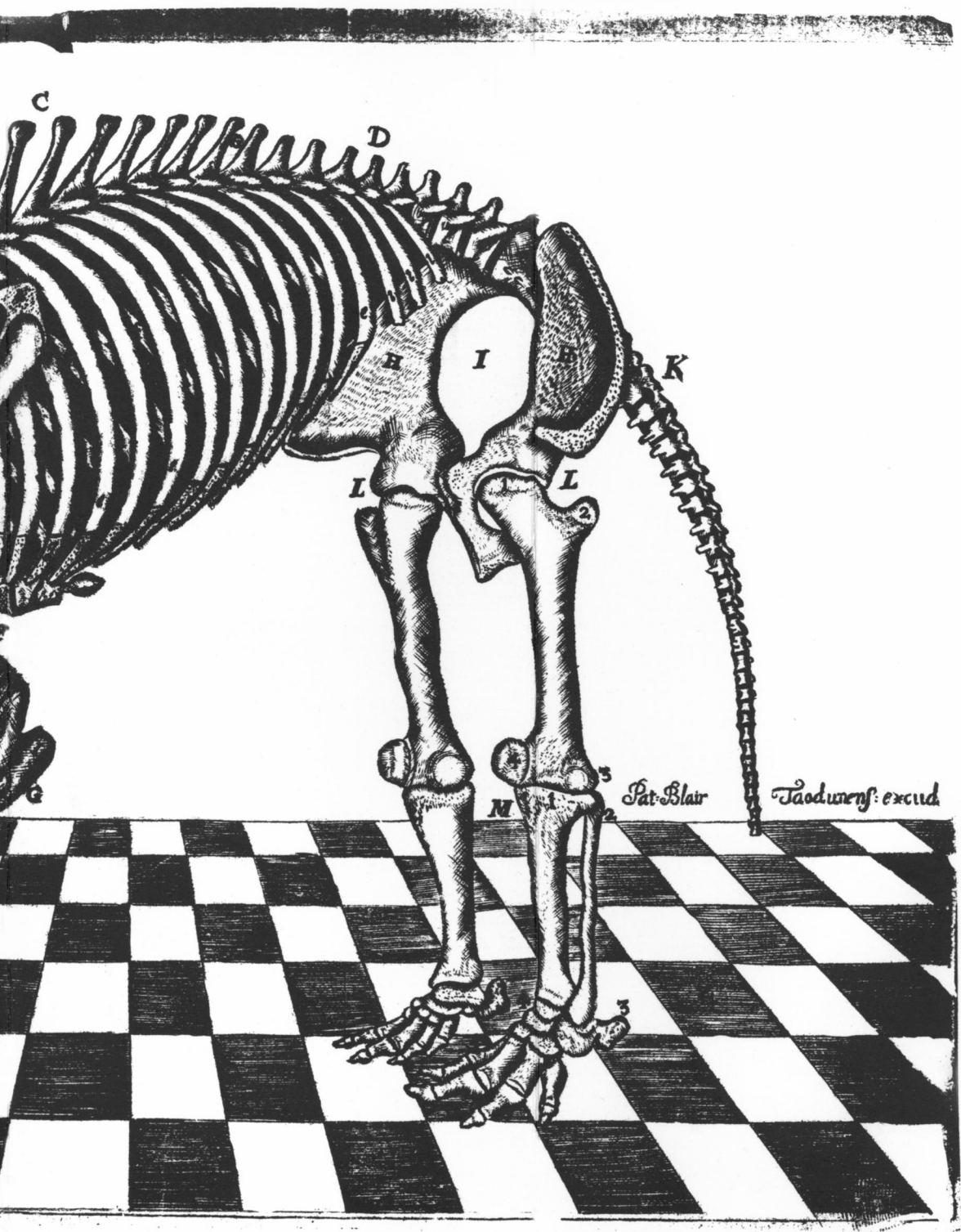
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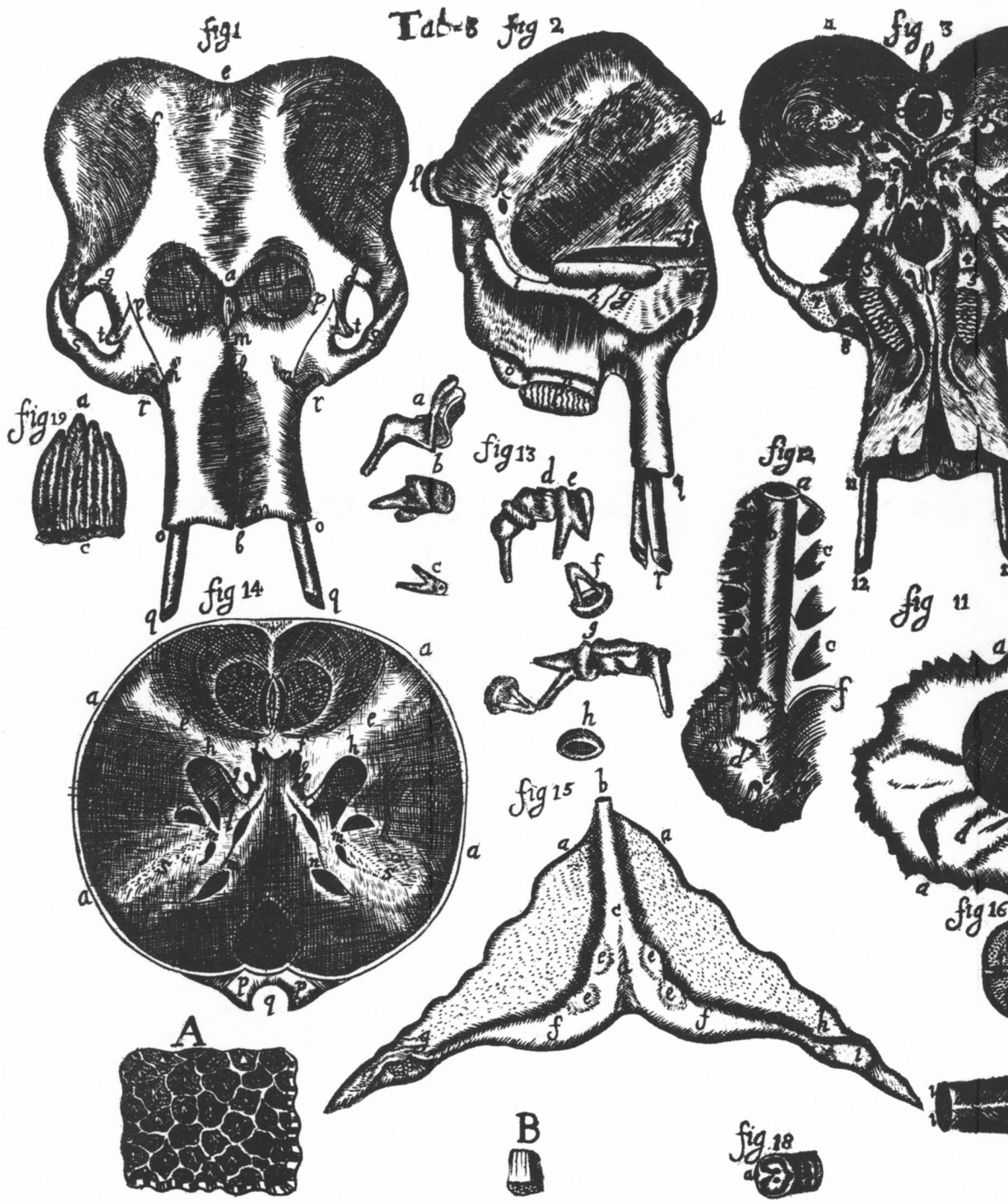
- a.* The Insertion of the *Musculus Masseter*
- y.* The space for the Mouth betwixt the *Os Palati* and lower Jaw.
- z.* An Orifice from which the *Nervus Maxillaris inferior* proceeds.
- B.** The *Vertebra* of the Neck.
- 1.* The first *Vertebra*.
- 2.* The second *Vertebra*, or Tooth which rises higher than the rest.
- 3.* The third *Vertebra* having scarce any Spinal Process.
- 4.* The 4th, whose Spinal Process is not yet seen.
- 5.* The 5th, with the Spinal Process beginning to appear.
- 6.* The 6th, whose Spinal Process ascends higher, and is remarkable at its fore-part, as in *Tab. 4.*
- 7.* The 7th, whose Spinal Process still ascends, and with whose back-part the first Rib is articulated.
- C.** The *Vertebra* of the Back.
- 1.—13.* Their *Processus Spinosi*, which have no Protuberance at their Extremity, whereof *1.—C.* are the longest, and *C.—13.* become gradually shorter.
- D** The Spinal Processes of all the rest of the *Vertebra* to the *Os Sacrum* which are shorned by degrees.
- xxxxx &c. the oblique Processes of the *Vertebrae*.
- E.** The *Scapula*.
- a. a.* The spongy Margin of the *Scapula*.
- b. b.* Its *Processus Spinosus* sending forward a Protuberance.
- c. c.* Its Neck.
- d. d.* The *Epiphysis* which receives the *Humerus*.
- e. e. &c.* The Ribs.
- f. f. &c.* The Ribs which appear on the opposite side.
- g. g.* The Cartilages of the *Sternum*.
- h. h.* The Bones of the *Sternum*.
- i. i. i.* The three Ribs which have no Cartilages
- l. l. l.* The Bodies of the three *Vertebrae Lumborum*.
- F.** The *Humerus*.
- 1.* Its upper part, spongy and rugous, for the Insertion of Tendons.
- 2.* Its middle part more solid.
- 3.* A large oblique *Sinus* for lodging the *Biceps*.
- 4.* Its lower Extremity articulated with the *Cubitus* and *Radius*.
- G.** The *Cubitus* and *Radius*.
- 1.* The *Olecranon*.
- 2.* An hollowness on the outside of the *Cubitus*.
- 3.* The *Radius*.
- 4.* Its lower *Epiphysis*, rugous, and separated from it by a Suture,
- 5.* The lower *Epiphysis* of the *Cubitus*, separated likewise by a Suture.
- 6. 6.* Three Bones of the first Rank of the *Carpus*.

Tab 2



Curi et Imp's: Pat. Blatt, Gilb. Orum Tardwens: pinx. et sculp.





Curà et Impens: Pat: Blair Gilb: Orum Taeniarhynchus Pinx: et sculp: it



- | | |
|--|---|
| 7. 7. 7. Three Bones of the second Rank. | 1. The <i>Epiphysis</i> receiv'd by the <i>Ossa Innominata</i> , and articulated with the <i>Femur</i> by a Suture. |
| 8—8. The Bones of the <i>Metacarpus</i> . | 2. The <i>Trochanter major</i> . |
| 9—9. The first Bones of the Toes. | 3. The lower <i>Epiphysis</i> . |
| 10—10. The second Bones of the Toes. | 4. The <i>Patella</i> . |
| H. H. The <i>Ossa Innominata</i> represented in <i>Profile</i> . | M. The <i>Tibia</i> . |
| I. The <i>Pelvis</i> . | 1. <i>Perone</i> . |
| K. The Tail. | 2. The <i>Talus</i> . |
| L. L. The two Thigh Bones. | 3. The Bones of the <i>Tarsus</i> . |
| | 4. The Bones of the <i>Metatarsus</i> . |
| | 5. The Bones of the Toes. |

T A B U L A III.

Represents the Head in different Views, Parts of the Ear, Proboscis, and Uterus.

- Figure 1.** Represents the fore-part of the Head.
- | | |
|--|---|
| a. The Hole for the Root of the Trunk. | g. The upper Production of the <i>Sinus</i> where the Eye is lodg'd. |
| b. The lower part of the <i>Os Palati</i> , over which hangs the <i>Proboscis</i> . | h. The Beginnings of the <i>Laminae</i> which run betwixt the two Tables of the Scull, and here appear in the bottom of the Hole for the Root of the <i>Proboscis</i> . |
| c. c. A Depression of the Bone on each side, for lodging of the Muscles of the lower Jaw. | i. The <i>Os Vomeris</i> to which the <i>Cartilaginous Septum</i> of the <i>Proboscis</i> was adherent. |
| d. d. The two Eminences on each side at the top of the Head. | k. The beginning of the Depression of the <i>Os Palati</i> . |
| e. A Depression in the middle betwixt these two Eminences. | l. The middle of the <i>Sinus</i> for the Orbit of the Eye. |
| f. f. Two Beginnings of the Angles for forming the Depressions for the Muscles of the lower Jaw, betwixt which the Surface of the Bone begins to be plain. | m. The Articulation of the two <i>Ossa Palati</i> . |
| | n. n. The Articulation of the <i>Os Maxilla</i> with the <i>Os Palati</i> ; where also is a <i>Crena</i> for containing the Blood Vessels, as they |

they go to the nourishment of the *Proboscis*.

o. o. The Place where the Tusks proceed from the *Os Palati*.

p. p. The upper part of the Articulation of the *Os Maxilla* with the *Os Palati*.

q. q. The broken Extremities of the Tusks.

r. r. A great Oval Hole in the *Os Maxilla*, through which a considerable Branch of the 5th Pair of Nerves, and a large Artery from the *Arteria dura Mavis* pass to and are dispers'd in the *Proboscis*, and by which a big Vein returns and joins to the *Vena jugularis*.

s. The *Os Zygomaticum*.

t. The middle Production for the Orbit of the Eye.

Figure 2. represents the Side of the Head.

a. The beginning of the Depression for the Muscles of the lower Jaw and *Proboscis*.

b. The Insertion of the *Retractor Proboscidis*.

c. The Insertion of the *Musculus Temporalis*.

d. The bottom of the Orbit of the Eye.

e. Its upper Production.

f. Its lower Production.

g. The Articulation of the *Os Maxilla* with the *Os Zygomaticum*.

h. The *Os Zygomaticum*.

i. The Articulation of the *Os Zygomaticum* with the *Os Calvaria*.

k. The Orifice of the *Meatus Auditorius*.

l. One of the *Condyles* of the *Occiput*, which is articulated with the first *Vertebra*.

m. The Orifice of the large Oval Hole in the *Os Maxilla*.

n. The fore Grinder in the upper Jaw.

o. The hind Grinder, or rather Wedge for keeping the fore Grinder fast.

p. The undulate Lines in the lower Surface of the Teeth.

q. The beginning of the Tusks as they proceed from the *Os Palati*.

r. Their broken off Extremities.

s. The *Sinus* in the bottom of the Orbit of the Eye for the *Nervus Opticus*.

Fig 3. represents the back-part of the Head.

a. a. The two Eminences at the upper part of the Head enlarg'd, whereby the *Sinus* betwixt them becomes narrower and deeper.

b. The *Sinus* betwixt these Eminences shortned.

c. c. The two *Condyles* which are receiv'd by the first *Vertebra*.

d. The Hole for the Spinal Marrow.

e. e. Two Protuberances above the *Meatus Auditorius*.

f. The

- f. The Orifice of the *Meatus Auditorius*.
- g. A *Sinus* whence the *Processus Styloides* arises, which is shewn by itself.
- h. The Cartilage whereby the *Processus Styloides* is articulated with the Skull.
- i. Its longest and smallest part.
- k. Its shortest and biggest part.
- l. The Orifice for the *hard Portion*.
- m. m. The Hole for the Jugular Vein and *Par vagum*.
- n. n. The bony part of the *Aqueduct*.
- o. o. The Extremity of the *Aqueduct* where the fleshy part begins.
- p. p. The Hole for the Carotid Artery.
- q. q. The Hole for the *Arteria dura Matris*, and 3d Branch of the 5th Pair.
- r. The middle of the Base of the Skull beneath the Hole for the Spinal Marrow, where the Bone is somewhat raised.
- s. A Depression on the Base of the Skull before the *Choana* begins.
- t. The *Choana*, or Passage between the Root of the Trunk and the Mouth.
- u. A Production of the *Vomer*, or *Septum*, which divides the *Choana* in two.
- x. The Articulation of the *Os Zygomaticum* with the *Os Occipitale*.
- y. The *Glenoid Cavity* for Reception of the lower *Condylus* of the lower Jaw.
- z. The *Sinus* for the Globe of the Eye.
1. The *Os Zygomaticum*.
2. The fore Grinder on the right side.
3. The hind Grinder on the right side.
4. The hind Teeth on the left side, which not grinding at all, only serve as a Wedge.
5. The fore Teeth on the left side, the back-part of which does not Grind.
6. 6. The lower Surface of the Grinders, where their undulate Lines appear.
7. 7. Part of the *Os Maxilla*, where it is articulated with the *Os Zygomaticum*.
8. 8. The great Oval Hole in the *Os Maxilla*.
9. 9. The back-part of the *Os Palati*.
10. The Interstice between the the *Offa Palati* on the back-side.
11. 11. The Tusks as they proceed from the *Os Palati*.
12. 12. The two broken off Extremities of the Tusks.
- Fig. 4. represents the Skull saw'd transversely, so that its lower part with the Base appear.
- a. a. The outward Table of the Skull.
- b. b. The inner Table.

c. c. The *Lamina* which pass betwixt the two Tables.

d. d. the Cells form'd by these *Laminae*.

e. e. The Orifices for Vessels which penetrate the *Laminae*.

f. The Seat of the Brain, represented at more length in Fig. 3.

g. g. The two *Condyles* which are receiv'd by the first *Vertebra*.

h. The Hole for the Spinal Marrow.

i. The *Os Zygomaticum*.

Fig. 5. represents the upper part of the Skull saw'd transversely, with the Cells running betwixt the two Tables and *Laminae* which cover the Seat of the Brain.

Fig. 6. represents the outside of the upper part of the Skull saw'd transversely.

a. a. Two Eminences on the top of the Skull.

b. A *Sinus* betwixt these two Eminences.

c. A long *Spina* in the bottom of the *Sinus*.

Fig. 7. represents the fore-part of the lower Jaw.

a. a. The two *Condyles*.

b. b. The two *Processus Coronae* shortened by the opposite view.

c. c. The fore Grinders of the lower Jaw.

d. The distance between the two Jaws for lodging the Tongue.

e. The *Symphysis Menti*.

Fig. 8. represents the back parts of the lower Jaw.

a. a. Two *Condyles*.

b. b. Two large Orifices of a Cavity, wherein enter the Vessels for nourishing the Teeth, and wherein are lodg'd the *Rudimenta dentium*, as in Fig. 19.

c. c. The two fore Grinders of the lower Jaw.

d. d. The undulate Lines in their upper Surface.

e. The distance between them for lodging the Tongue.

f. The Concave part of the lower Jaw.

Fig. 9. represents one side of the lower Jaw.

a. a. The two *Condyles*.

b. b. The two *Processus Coronae*.

c. A Protuberant part of the lower Jaw where the *Rudimenta dentium* are lodg'd.

d. The inner Grinder of the lower Jaw.

e. The outward Grinder, where are represented the Ridges and Interstices of the sides of the Teeth.

b. The *Symphysis Menti*.

Fig. 10. represents the lower part of the *Processus Petrosus*, wherein are shewn

a. a. A part of the *Meatus Auditorius* opened.

b. The

b. The *Crena* for the *Membrana Tympani*.

c. The *Cavitas Tympani*, endued with several *Cells*, and Interstices betwixt them.

d. A Continuation of the same Cavity.

e. The Orifice of the hard Portion of the *Nervus Auditorius*.

f. The ragged Margin of the Bone.

Fig. 11. represents the inner Surface of the upper part of the *Processus Petrosus*.

a. a. The ragged Margin of the Bone.

b. b. The upper part of the *Cavitas Tympani*.

c. The *Foramen Ovale*.

d. A Protuberance, within which is the Cavity of the *Cochlea*.

e. The Orifice for the hard Portion of the *Nervus Auditorius*.

Fig. 12. represents the *Meatus Auditorius* with the *Processus Petrosus*.

a. The External Orifice of the *Processus Petrosus*.

b. b. The *Meatus Auditorius* deriv'd from the *Lamina* above, and running from the outer Table to the *Processus Petrosus*.

c. c. The *Lamina* and *Cellules*, as they proceed from the *Processus Petrosus* on each side.

d. The *Processus Petrosus*.

e. *Orificium Foraminis Nervi Auditorij*.

f. Part of the inner Table of the Skull.

Fig. 13. represents the Bones of the Ear in their proper Dimensions and different Views.

a. The *Malleolus*.

b. The *Incus*.

c. The *Stapes* without the Base.

d. e. The back-part of the *Malleolus* and *Incus* articulated together.

f. The *Stapes* with its Base.

g. The *Malleolus*, *Stapes*, and *Incus* articulated together, whereby is shewn the true distance betwixt the *Membrana Basis Tympani*, and the *Foramen Ovale*, which the Base of the *Stapes* shuts.

h. The Base of the *Stapes*.

Fig. 14. represents the Seat of the Brain enlarg'd, that the Orifices for the Blood Vessels and Nerves may be the more obvious.

a. a. The inner Table depriv'd of the surrounding *Cellules*.

b. b. The anterior *Sinus*.

c. c. The *Os Ethmoides*, with its Eminences, *Sulci*, and *Foramina* for the *Nervus Olfactorius*.

d. The *Crista Galli*.

e. e. The anterior Eminences.

f. f. The Orifice for the *Nervus Opticus*.

g. g. The Hole called the *Foramen Lacerum*, through which pass the *Nervi Motorij Trigemini Ophthalmici*, or first Branch of the 5th and the 6th Pair.

h. h. The 2d Branch of the 5th Pair.

i. i. The third Branch of the *i.* The *Ovarium* covered with the Membrane.

k. k. The Hole for the *Arteria dura Matris.*

l. l. The Hole for the Carotid Artery.

m. m. The Hole of the *Nervus Auditorius.*

n. n. The Hole for the Jugular Vein.

o. The Hole for the Spinal Marrow.

p p. Part of the two *Condyles.*

q. The External Hole for the Spinal Marrow.

r. r. The two middle *Fossæ.*

s. s. The *Processus Petrosus.*

t. t. The *posterior Fossa*, or Seat of the *Cerebellum.*

u. The Seat of the *Glandula Pituitaria.*

Fig. 15. represents the *Uterus.*

a. a. Part of the *Ligamenta lata Uteri.*

b. Part of the *Vagina* cut off.

c. The beginning of the Body of the *Uterus,*

d. Divided into two Portions, with an Interstice in the middle.

e. e. Several Eminences representing the External part of so many *Cellules.*

f. f. The *Cornua Uteri.*

g. A loose Membrane wrapt up, that the *Ovaria* below may appear.

h. The *Ovarium* depriv'd of the thick loose Membrane which fluctuates above it.

Fig. 16. represents the *Proboscis* cut transversly.

a. a. The two Cavities of the *Proboscis.*

b. The *Septum* which divides the Cavities.

c. c. The tendinous Interfection which runs from before to behind.

d. d. The tendinous Interfection which runs from the Right to the Left.

e. e. e. e. The Insertion of the *4* Muscles into the tendinous Interfection, whereby the Fibres of the one ascend, and the other descend obliquely.

Fig. 17. represents the dissected *Proboscis.*

a. The External part of the Cartilage which surrounds the Cavity of the *Proboscis*, as it arises from the Hole in the fore-part of the Skull.

b. b. That Pair of Muscles call'd the *Levatores Proboscidis*, rais'd from above the foresaid Cartilages, with their inner Surface turn'd up, that the Divarications from the Blood Vessels in them may appear.

c c. The Orifices of the Veins dispers'd in these Muscles.

d. d. The Orifices of the Arteries.

e. e. Their several Branchings.

f. The descent streight along above the Cavity of the *Proboscis.*

g. g. The oblique descent of the Fibres of the *Erectores* of the *Proboscis*.

b. The tendinous Interfection running down the middle of the *Proboscis*.

i. i. The Orifices of the Cavities of the *Proboscis*.

Fig. 18. represents the Extremity of the *Proboscis* cut off.

a. A Protuberance arising from the fore-part of the Extremity of the *Proboscis*, and is extended into a Cavity in the back part *b.* whereby the Animal catches hold of any thing.

Fig. 19. represents one of the Rudiments of the Teeth, which was taken out of the great Hole in the inner side of the lower Jaw, as represented (*b. Fig. 8*) but much enlarg'd in the proportion.

a. Its upper part, which is hard, solid, and white.

b. Its middle part distinguished by several Furrows and Ridges

c. Its lower part, which is hollow, and whereinto both the Blood Vessels that serve for its Nourishment, and a Branch of the Nerve call'd *Maxillaris Inferior*, proceeding from the 5th Pair, enters.

A. Represents a Portion of the *Cuticula*, wherein is shewn its inner Surface, and usual thickness; at its Margin at the left hand and lower part are several white lines, which I take to be the Lineaments of so many Blood Vessels; the Pyramids, from whence the Hairs proceed, with the several *Favi* or Depressions.

B. Represents one of the Scabs adhering to the *Cuticula*, where they are thickest.

T A B U L A IV.

Represents the Vertebrae of the Neck both separate and conjoin'd, Ossa Innominata, Scapula, the back-part of the fore and hind Feet, separate Bones of the Carpus and Tarsus, concave part of the Liver, and Os Hyoides.

Figure 1. Represents the fore and back-part of all the seven Vertebrae of the Neck.

A. The first *Vertebra* of the Neck with its upper part in Profile, to shew the Holes for the *Arteria Vertebralis*.

a. a. Two Protuberances, which reach on each side to the Skull.

b b. Two Cavities foreshortned, which receive the *Condyles* of the Skull.

c. c. The two Holes whereby the *Arteria Vertebralis* proceeds from the Skull, and perforates this *Vertebra*.

d. d. Two Holes through which the Artery passes out from this *Vertebra*.

e. e. A *Crena* betwixt the two foresaid Holes, where the Artery is lodg'd.

A. 1. The fore-part of the first *Vertebra* shewn at large.

a. The Hole for the Spinal Marrow.

b. The Hole for receiving the Tooth of the following *Vertebra*.

c. c. Two Cavities for receiving the *Condyles* of the Skull.

d. d. Two Holes for the Cervical Artery.

e. The upper part of the *Vertebra*.

f. Its lower part.

g. g. The transverse Processes, whose Protuberances at the Extremities are represented, *A. a. a.*

B. 1. The back-part of the first *Vertebra* shewn at large.

a. The Hole for the Spinal Marrow.

b. The Hole for the Tooth of the following *Vertebra*.

c. c. The Cavities which receive the body of the following *Vertebra*.

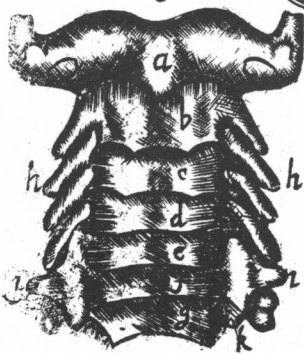
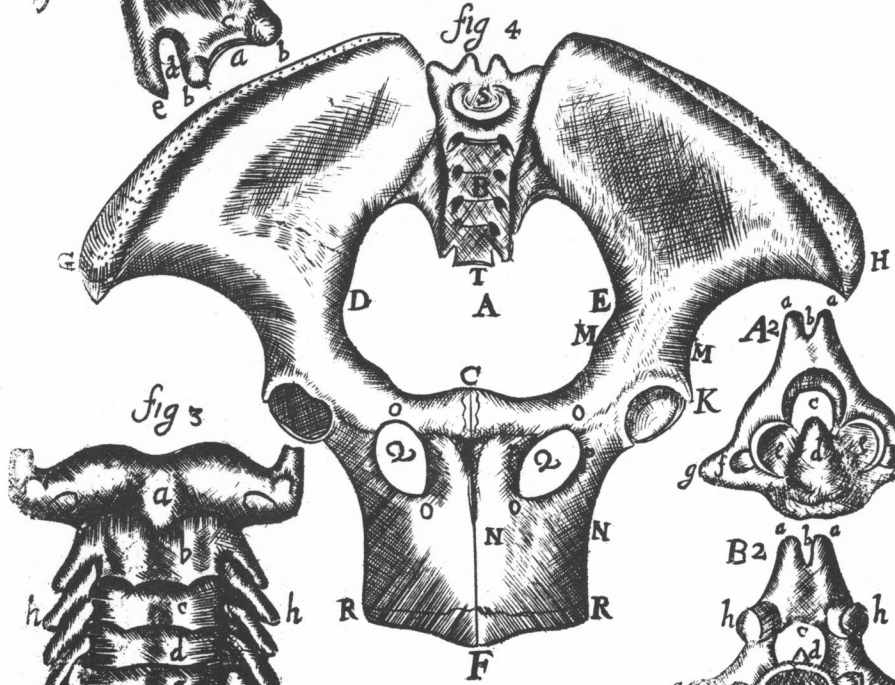
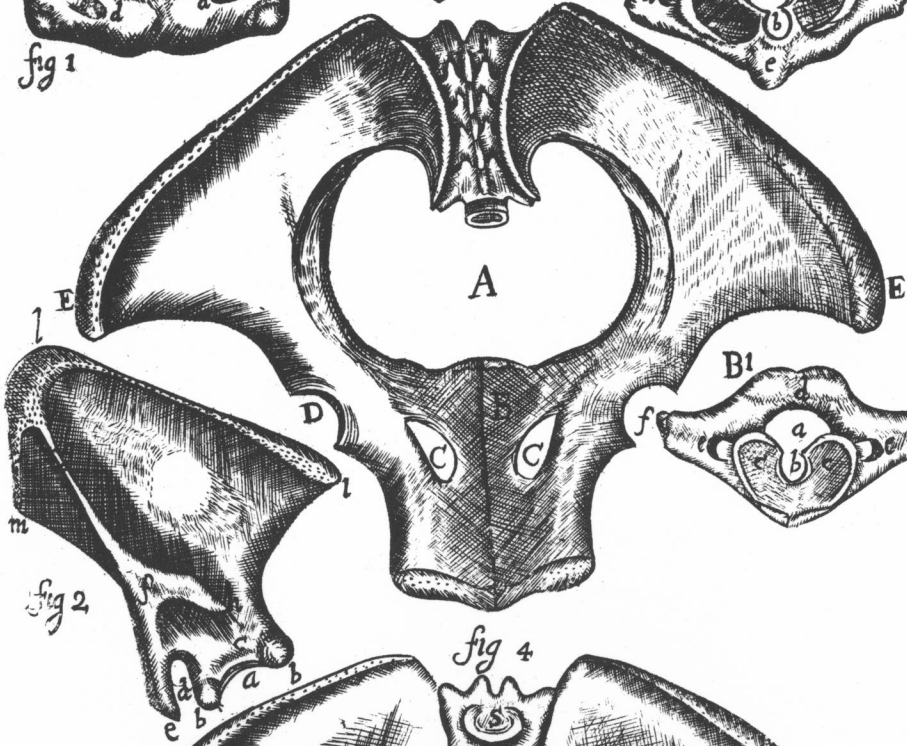
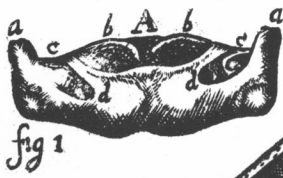
d. The lower part of the *Vertebra*.

e. e. The Holes for the Cervical Artery.

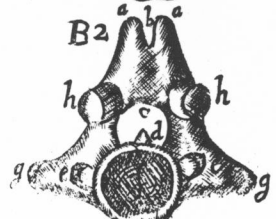
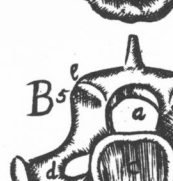
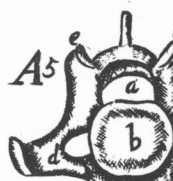
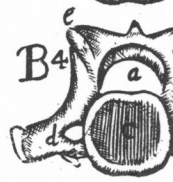
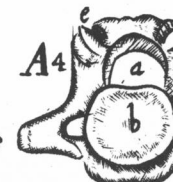
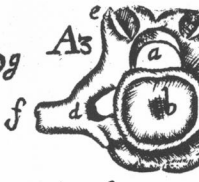
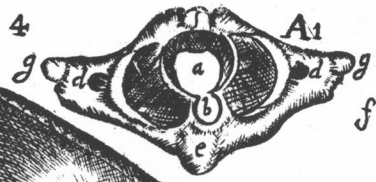
f. f. The two transverse Processes.

A. 2. The fore part of the second *Vertebra*.

a. a. The forked Extremities of the Protuberance, which arises instead of the *Processus Spinosus*. *b. A*

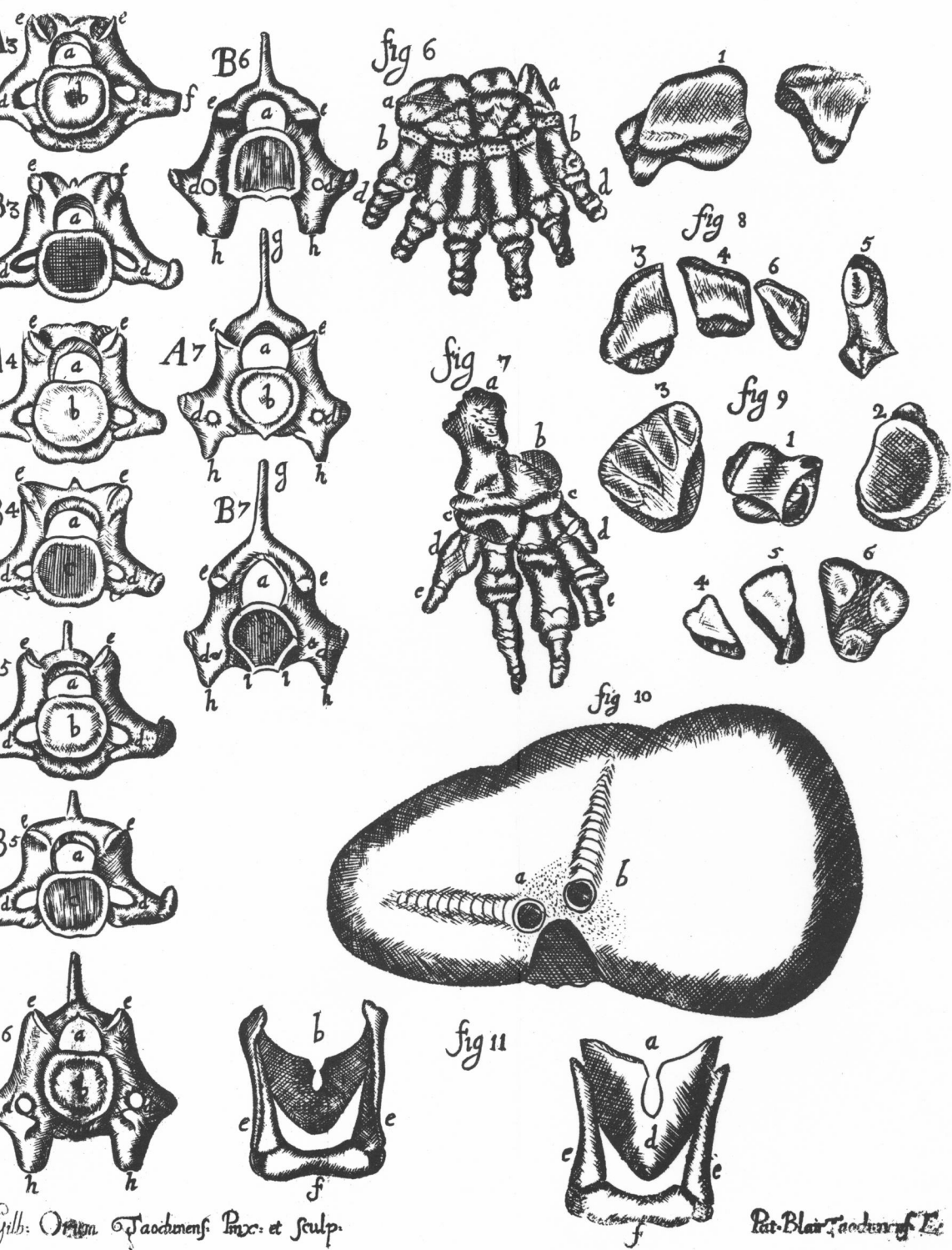


Tab 4
fig 5



Cura et Impensis Patricij Blair

Gill: Organ



Gill: Origin Tauchnens: Pmc: et sculp.

Pat. Blair Tauchnens: Et

- b.* A *Sinus* betwixt them.
- c.* The Hole for the Spinal Marrow.
- d.* The Tooth which is receiv'd by the first *Vertebra*.
- e. e.* The two convex Surfaces which are receiv'd into the hind Cavities of the first *Vertebra*.
- f. f.* The two Ho'es for the Cervical Artery.
- g. g.* Two transverse Processes.
- h.* The lower part of the *Vertebra*.
- B. 2.** The back-part of the same *Vertebra*.
- a. a.* The Protuberances of the *Processus Spinosus*.
- b.* The *Sinus* betwixt them enlarg'd on the side.
- c.* The Hole for the Spinal Marrow.
- d.* The Point of the Tooth appearing from the other side.
- e. e.* The Holes for the Cervical Artery.
- f.* The concave Body of the *Vertebra*, which receives the convex Surface of the following *Vertebra*.
- g. g.* The *transverse Processes*.
- h. h.* The two oblique Processes which receive the oblique Processes of the following *Vertebra*.
- Note,** That the five following *Vertebrae* are represented by A. B 3, 4, 5, 6, 7; whereof A. represents the fore-part,
- B. the back-part; all the rest of the small Letters showing as follows.
- a. a.* &c. The Hole for the Spinal Marrow.
- b. b.* &c. Their convex Bodies, which are received by the concave Surfaces of the following.
- c. c.* &c. Their concave Bodies, which receive the convex Surfaces of the former.
- d. d.* &c. The Holes for the Cervical Artery.
- e. e.* &c. The oblique Processes.
- f. f.* &c. The transverse Processes.
- g. g.* &c. The Spinal Processes, which in the fore-part of 3, 4, scarcely appear, but in their back-part appear a little, in 5 arise to $1\frac{1}{2}$ Inch, and in 6 to 3 Inches.
- h. h.* In 6, 7, are Protuberances, which run back to guard the Cervical Artery as it passes from between the bodies of the *Vertebra*, and quits the Perforation in their transverse Processes.
- i. i.* Two *Sinus's* in the back-part of the seventh *Vertebra*, which with the like Surfaces in the following make up a Cavity, whereinto the *Condylus* of the first Ribs are receiv'd.

Figure 2. Represents the *Scapula*.

- a. The Head of the *Scapula*, whereby it is articulated with the *Humerus*.
- b. b. The two Protuberances on each side of its Head.
- c. The Neck of the *Scapula*.
- d. A *Sinus* between the *Processus Coracoides* and the Neck of the *Scapula*.
- e. The *Processus Coracoides* of the *Scapula*.
- f. The *Processus Spinosus*.
- g. The Extremity of the *Processus Spinosus*.
- h. A Protuberance running forward from the *Processus Spinosus*.
- i. The forepart of the upper edge of the *Scapula*.

l. A thick spongy *Epiphysis*, which (at the upper edge of the *Scapula*) was separated by boiling.

m. The Angle at the back-part of the *Scapula*.

Figure 3. Represents the lower or fore-part of the seven *Vertebra* of the Neck.

- a. b. c. &c. The lower or fore-part of the bodies of all the *Vertebrae*.
- b. b. The transverse Processes, which run obliquely forward.
- i. i. The transverse Processes of the 6th *Vertebra*, running both before and behind to guard the *Arteria Cervicalis*.
- k. A *Sinus* in the Body of the seventh *Vertebra*, for receiving a part of the first Rib.

Figure 4. represents the fore-part of the *Ossa Innominata*.

	Feet, Inches.
A. The <i>Pelvis</i> in Circumference	4 6
B. The <i>Os Sacrum</i> .	
C. The upper part of the <i>Os Pubis</i> .	
B. C. Between the <i>Os Sacrum</i> and the <i>Os Pubis</i> .	1 6
D. E. From the Right to the Left of the <i>Pelvis</i> .	1 5
C. F. From the upper to the lower part of the <i>Os Ilium</i> .	1
G. H. Betwixt the two outward Extremities of the <i>Ossa Innominata</i> .	3 6
B. H. From the <i>Os Sacrum</i> above to the foresaid Point.	2 9 ¹ / ₂
From H. to K.	1
L. The Circumference of the <i>Acetabulum</i> .	1 6
E. H. Breadth of the <i>Os Ilium</i> .	1 1
M. M. Circumference of the Neck of the <i>Ilium</i> .	1 2
N. N. Breadth of the <i>Os Pubis</i> .	8
O. O. The length of the <i>Foramen Ovale</i> for the <i>Musculus Marsupialis</i> .	5 ¹ / ₂
P. P. Its Breadth.	4
Q. Q. Its Circumference.	1 1
R. R. The Breadth of the <i>Ossa Pubis</i> before.	1 5
S. T. The length of the <i>Os Sacrum</i> , from whence it is join'd with the <i>Vertebrae Lumborum</i> , to where 'tis join'd with the Tail.	

Fig. 5. represents the back-part of the *Ossa Innominata*.

- | | |
|---|--|
| <p>A. The <i>Pelvis</i>.</p> <p>B. The back-part of the <i>Ossa Pubis</i> at their Articulation, where there is large Cavity.</p> <p>C. C. The Oval Hole for the <i>Musculus Marsupialis</i> fore-shortned.</p> <p>D. The Cavity for the <i>Acetabulum</i>.</p> <p>E. E. The Margin of the <i>Os Ilium</i>, which separated by boiling.</p> | <p>F. The back-part of the <i>Ossa Innominata</i>, shewing their Spinal and oblique Processes.</p> |
|---|--|

Fig. 6. represents the back part of the Fore Foot.

- | |
|--|
| <p>a. a. The Bones of the <i>Carpus</i>.</p> <p>b. b. The Bones of the <i>Metacarpus</i>.</p> <p>c. c. The <i>Ossa Sesamoidea</i>, whereof there are two upon the lower Extremity of each Bone of the <i>Metacarpus</i>.</p> <p>d. d. The Bones of the Toes.</p> |
|--|

Fig.

Fig. 7. represents the back-part
of the Hind Foot,

a. The *Talus*.

b. Part of the *Astragalus*.

c. c. Bones of the *Tarsus*.

d. d. Bones of the *Metatarsus*.

e. e. Bones of the Toes.

Fig. 8. represents the Bones of
the *Carpus* separately.

1. The upper Surface of the
External Bone of the first
Rank of the *Carpus*.

2. The middle Bone.

3. The third Bone of the first
Rank.

5. 6. The upper Surface of the
three Bones of the second
Rank.

Fig. 9. represents the Bones of
the *Tarsus* separately.

1. The upper Surface of the
Astragalus.

2. The upper Surface of the *Os*
Naviculare, much enlarg'd in
proportion to the rest.

3. Its lower Surface.

4. 5. 6. The upper Surface of
the *Offa Cuneiformis*.

Fig. 10. represents the concave
side of the Liver.

a. The *Vena Porta*.

b. The *Vena Cava*.

Fig. 11. represents the *Os Hy-*
oides.

a. The fore-part.

b. The back-part.

d. d. The *Cartilago Scutiformis*.

e. e. The lateral *Offa Hyoidea*.

f. f. The Bones of the Base of
the *Os Hyoides*.

L O N D O N :

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